Section 7
BASINS Utilities

Several BASINS utilities have been developed to assist with data management and watershed assessment. The data management tools are used to update existing data or to add additional local or regional data to supplement or replace BASINS data products. The comprehensive data products included in BASINS were developed based on nationally available information and are suited for large-scale assessments. However, when dealing with localized small-basin analysis, higher-resolution data might be necessary to effectively capture the site-specific feature variability. The BASINS utilities includes six main functions that allow the user to delineate subwatershed boundaries, import new data sets, reclassify existing land use data, manage water quality station data, reclassify Digital Elevation Model (DEM) data, and access reference tables. These tools and their functions are described below.

- *Watershed Delineation*: This tool is used to create subwatershed boundaries within a cataloging unit, thereby allowing the user to evaluate and model water quality conditions on a subwatershed scale.

- *Import*: This tool is used to import additional data sets and to prepare the data to make them compatible with BASINS GIS functions and models. The *Import* tool is currently designed to function on four data types—watershed boundaries, land use, Reach File Version 3, and Digital Elevation Model (DEM).

- *Land Use Reclassification*: This tool is used to change land use classifications within an existing data set. Reclassification allows the user to update land use data to evaluate the effect of land use changes on water quality.

- *Water Quality Observation Data Management*: This tool is used to manage water quality data by allowing the user to add new stations, delete unnecessary stations, relocate misplaced stations, and incorporate new data into existing stations.

- *DEM Reclassification*: This utility is used to tailor the display of the topographical data.

- *Lookup Tables*: This function allows the user to access several reference tables, including water quality criteria data, Standard Industrial Classification (SIC) codes and definitions, and STORET agency codes and definitions. In addition, a Projection Parameter table that displays the projection parameters for an active BASINS project is included under the *Lookup* menu.

7.1 Watershed Delineation

Purpose

The BASINS *Watershed Delineation* tool allows the user to segment a watershed into several smaller hydrologically connected watersheds for use in watershed characterization and modeling.

Application

A watershed boundary created using the BASINS *Watershed Delineation* tool allows a user to define the entire land area contributing to flow in a stream. The BASINS system enables a user to manually delineate watershed boundaries for analysis and modeling. This tool operates on ArcView vector data and does not require the Spatial Analyst Extension. Watersheds can be delineated for Reach File, V1 or Reach File, V3 stream segments depending on which Reach File data will be used for modeling. Single watersheds or watershed systems containing multiple subwatersheds can be delineated using the BASINS *Watershed Delineation* tool. Watershed analysis can be performed on delineated watersheds using the BASINS *Watershed Characterization Report* tools. Sample reports include landuse distribution, point sources (PCS), water quality data, toxic chemical releases (TRI), soil distribution (STATSGO), and elevation (DEM). Watershed modeling can also be performed on a single delineated watershed or multiple watersheds using the BASINS *Nonpoint Source Model*.

The procedures for using the *Watershed Delineation* tool are described below for single and multiple watershed delineations. Watershed delineations procedures are the same for Reach File, V1 and Reach File, V3 stream segments. However, reach file data provided for the Pacific Northwest (PNW) region of the United States is in a different format then standard Reach File, V3 data and requires special data processing to prepare the data for watershed delineation and modeling. The procedures for delineating PNW reach data are included at the end of this section.

Procedures

> ### Key Procedures
>
> ✓ *Activate the Cataloging Unit Boundary theme*
>
> ✓ *Select the Cataloging Unit Boundary in which to perform the delineation*
>
> ✓ *Execute the Watershed Delineation Tool*
>
> ✓ *Select Reach File Version 1 or Version 3*
>
> ✓ *Assign a watershed name*
>
> ✓ *Create the watershed outline*
>
> ✓ *Create additional watershed outlines as needed*

Single-Watershed Delineation

1. Turn on the Cataloging Unit Boundaries and Reach File, V1 or Reach File, V3 themes. Reach File, V3 data will need to be imported using the BASINS ***Import*** tool (Refer to section 7.2). Zoom in on the area in which you wish to delineate a watershed.

> *Tip:* *It is recommended that you import and turn on the Reach File, V3 and DEM (elevation) themes for your selected area. Both themes are useful in defining the watershed boundaries.*

2. Activate and display the Cataloging Unit Boundaries theme.

3. Select the cataloging unit boundary in which the watershed delineation will be performed (Screen 7.1.1).
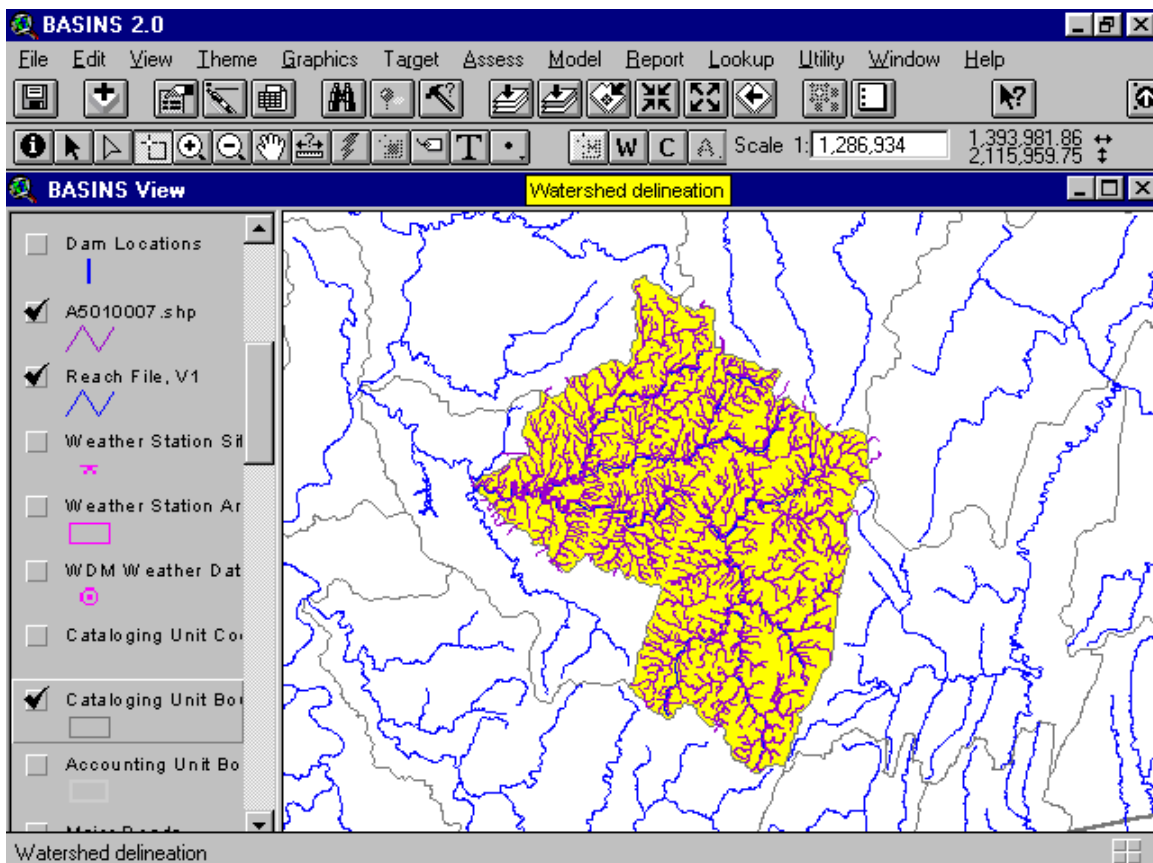
Screen 7.1.1

4. Click the BASINS **Watershed Delineation** tool button.

5. A dialog box will prompt you to select a Reach File (Screen 7.1.2). Select "Reach File, Version 1" or "Reach File, Version 3" depending on the stream level to be used for NPSM modeling. A unique ID will be assigned to the delineated watershed based on the Reach File, V1 or Reach File, V3 stream reach contained by the watershed. This unique ID is used for watershed characterization report functions and NPSM modeling.
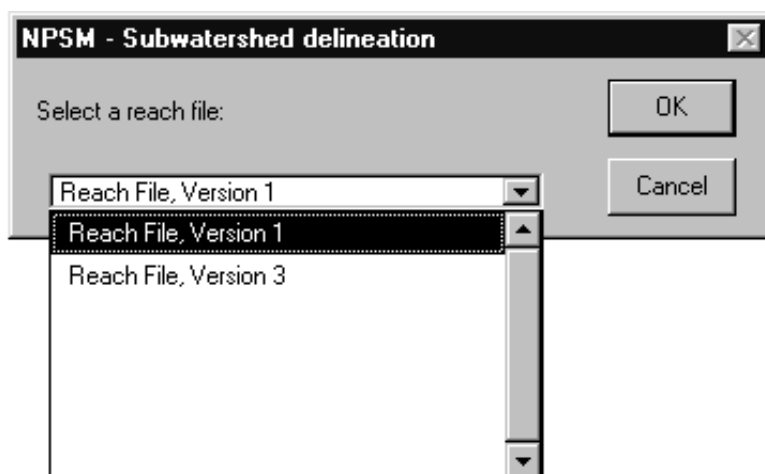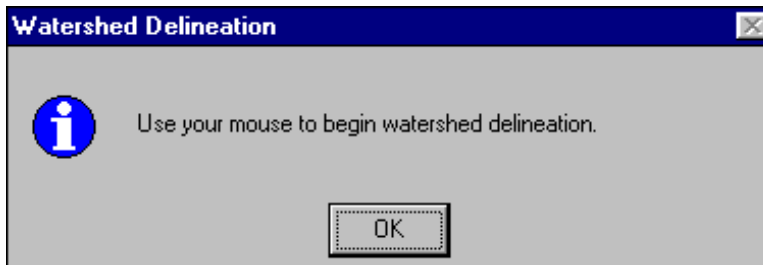

Screen 7.1.2

6. The next dialog box will prompt you: "Please assign a name to the delineated watershed" (Screen 7.1.3). At this prompt, enter a name of the watershed to be delineated. Click **OK** to save file and continue. The default directory for delineated watershed boundary themes is BASINS\DATA\<PROJECT NAME>\DELINEATED WATERSHEDS\.
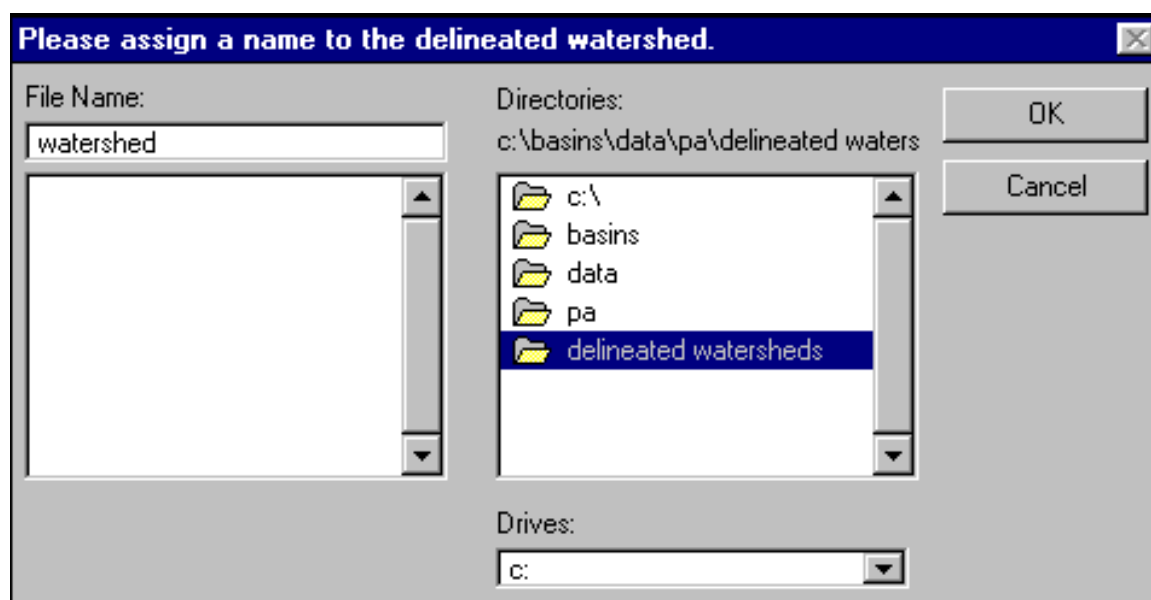
Screen 7.1.3

7. A window will prompt you to begin watershed delineation (Screen 7.1.3). Click **OK** to continue.
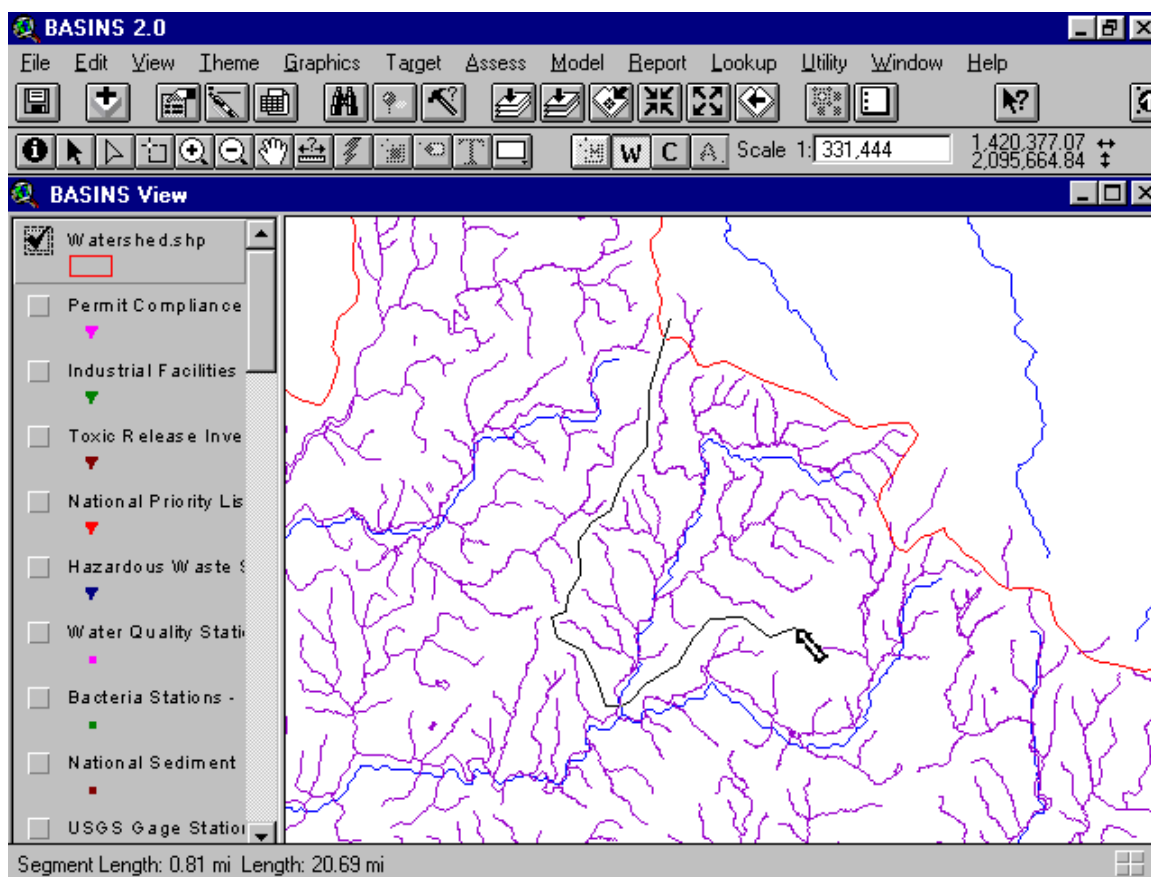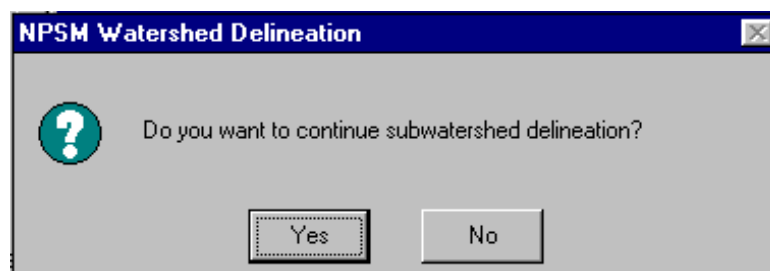
Screen 7.1.4

Tip: *The theme for your soon-to-be-created watershed will appear at the top of the themes list, the theme will be active, and the check box will display a check and a dashed outline. The dashed outline indicates that the theme is in edit mode and ready for watershed delineation.*

---

8. To delineate your watershed, you need to begin and end the delineation process at the boundary of the cataloging unit in which you are working. The cataloging unit boundary should now appear red. Place the mouse pointer slightly outside the cataloging unit boundary and click the left mouse button to begin delineation. Move the cursor to a point within the cataloging unit boundary and click the left mouse button once to create the first line segment of the watershed outline. Repeat this point-and-click process until the entire watershed outline is developed (Screen 7.1.5). Finish the watershed outline by double clicking the mouse at a point just outside the cataloging boundary. It is not necessary to delineate the portion of your watershed that coincides with the cataloging unit boundary. The delineation tool automatically clips your watershed at the cataloging unit boundary.

9. After completing the watershed delineation, you will be asked: "Do you want to continue subwatershed delineation?" For a single-watershed delineation, Select **No** (Screen 7.1.6).

Tip: *Best results are produced by an "out-and-back" procedure; that is, delineate in the direction of the watershed's pour point (on one side of the stream segment) and return to the cataloging unit boundary on the other side of the stream. Start the watershed delineation at the upper most stream segment (headwaters) within the study area and work down stream.*

Screen 7.1.5

Screen 7.1.6

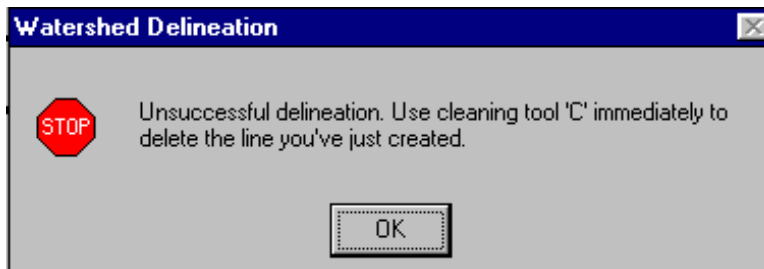*Tip:*   *If the watershed is not delineated successfully, either the watershed boundary will not appear or the watershed boundary will appear with a warning window (Screen 7.1.7). If the watershed boundary appears along with a warning, it is necessary to immediately clean (delete) the watershed. Click **OK** to continue. Watershed cleaning is discussed after Multiple-Subwatershed Delineation.*
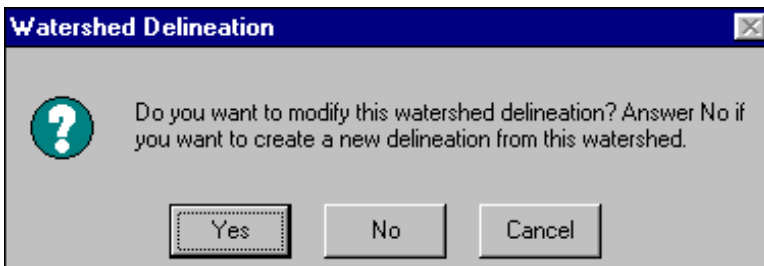

Watershed Delineation   ✕

🛑 STOP   Unsuccessful delineation. Use cleaning tool 'C' immediately to
delete the line you've just created.

[OK]

Screen 7.1.7
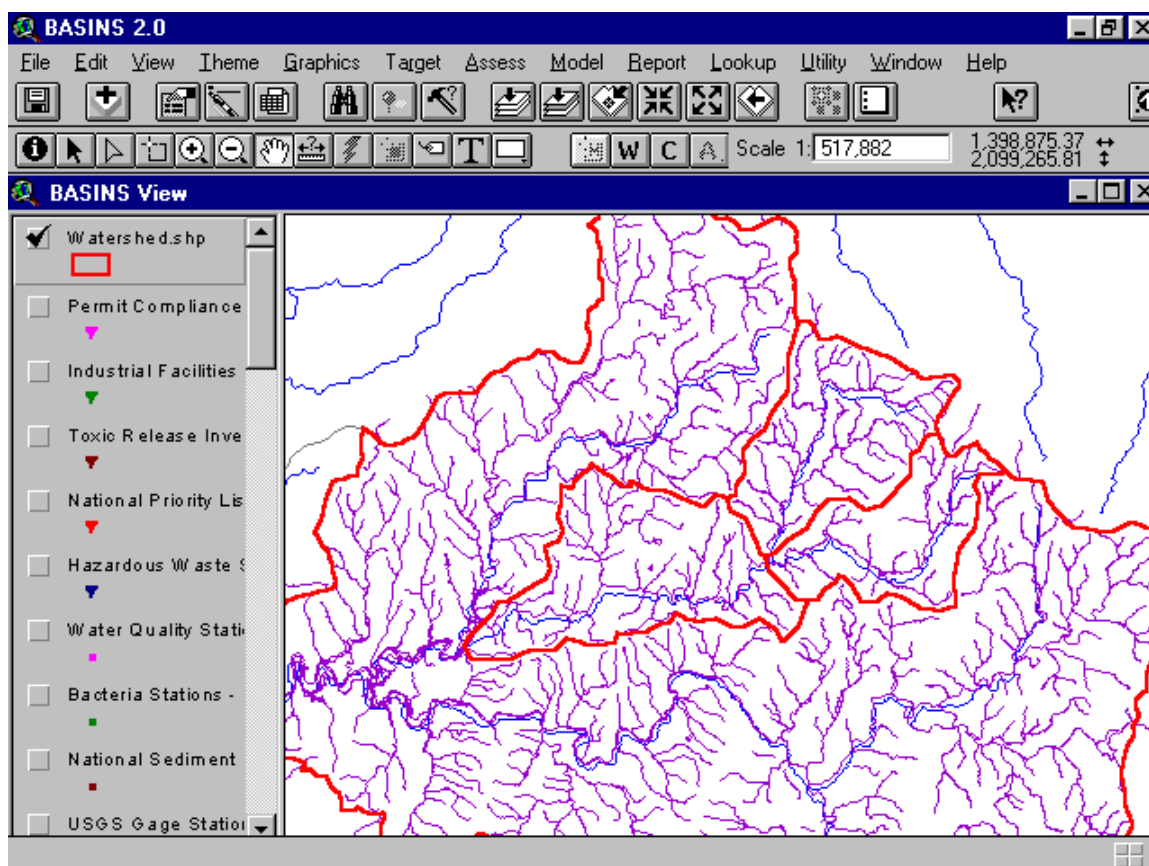

Multiple-Subwatershed Delineation

Multiple-subwatershed delineation lets you create and save a subwatershed system as a single .shp file. Subwatersheds in the system can be modeled and analyzed individually or as a group.

1. Activate the watershed boundary theme created above or start a new watershed delineation using the cataloging unit theme.

2. Select the BASINS **Watershed Delineation** tool button. If a user delineated watershed boundary theme is used, a dialog box will prompt: "Do you want to modify this watershed delineation?" (Screen 7.1.8). Answer **YES** to continue the delineation on the existing watershed theme. Answer **NO** to create a copy of the existing watershed boundary theme. This option allows you to alter a copy of the watershed delineation theme without making changes to the original theme.

Watershed Delineation   ✕

❓   Do you want to modify this watershed delineation? Answer No if
you want to create a new delineation from this watershed.

[Yes]   [No]   [Cancel]

Screen 7.1.8

3. Delineate a new watershed boundary using the methods described above for a single watershed delineation.

4. After completing a watershed delineation for the first subwatershed, you will be asked: "Do you want to continue subwatershed delineation?" Select **Yes** (Screen 7.1.6).

5. Begin delineation of the second subwatershed in the same manner as the first. For this delineation and subsequent subwatershed delineations, you can begin and end at a cataloging unit boundary or the boundary of a previously delineated subwatershed (in the same .shp file; i.e., the present subwatershed system being delineated). Subwatersheds will automatically be clipped where they cross either the cataloging unit boundary or the outline of another subwatershed (Screen 7.1.9).

Screen 7.1.9

6. Respond by clicking **Yes** after each subwatershed delineation if you would like to continue delineating more subwatersheds. When you have completed the final subwatershed in the system, click **No**.Watershed Cleaning

---

Tip: *Additional delineations can be performed using an existing watershed theme. Activate the appropriate theme and select the BASINS **Watershed Delineation** tool. A window will appear (Screen 7.1.5). Click **Yes** to delineate additional subwatersheds in the current watershed theme. Click **No** to create a new watershed .shp file. Click **Cancel** to exit delineation. The remaining steps are similar to those discussed above.*
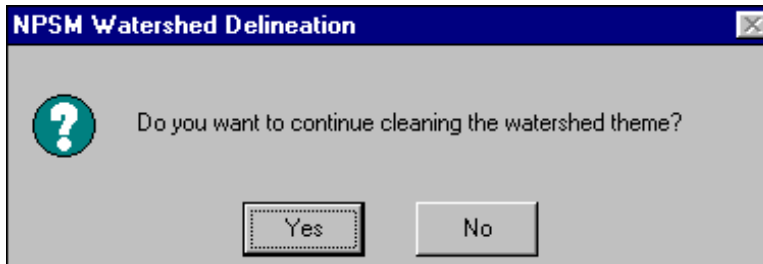

Watershed Cleaning

In many situations, it is necessary to delete a watershed or subwatershed that has been delineated improperly. The **Watershed Cleaning** tool can be used to delete a previously created watershed.

1. Turn on and activate the appropriate watershed theme.

2. Click the **Watershed Cleaning** tool.

3. Select the watershed boundary segment you wish to delete. A window will ask if you want to delete the line (Screen 7.1.10). Click **Yes** to delete the line. Note the selected watershed boundary is deleted.

NPSM Watershed Delineation

? Do you want to continue cleaning the watershed theme?

    Yes   No

Screen 7.1.10

4. After deleting the watershed, you will be prompted to continue cleaning (Screen 7.1.11). If you wish to clean additional watersheds associated with the watershed theme, click **Yes**. If you are finished cleaning the watershed theme, click **No**.

Watershed Delineation

? Do you want to delete this line?

    Yes   No
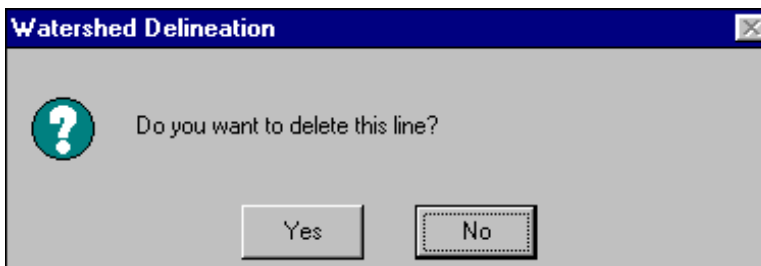
Screen 7.1.11

Tip: *If an unsuccessful delineation warning (Screen 7.1.7) continues to appear after clearing and trying to continue the watershed delineation, review the theme view and attributes table to make sure no small polygons (defective subwatersheds) were inadvertently created during the delineation. These polygons may not be visible until you zoom in on the view. Use the cleaning tool to remove any small polygons.*

TUTORIAL

- *Import the Reach File Version 3 theme: 05010007 and the DEM theme: 05010007.*

- *Zoom in on Cataloging Unit # 05010007. Either the DEM or the Reach File Version 3 can be used as an aid in delineation. Only the Reach File Version 3 theme will be used here.*

- *Turn on theme 05010007.*

- *Select Cataloging Unit # 05010007.*

TUTORIAL *(continued)*

- *Assign the name <u>watershed</u> to your delineation.*

- *Save the file in the BASINS\PA\DELINEATED WATERSHEDS directory.*

- *Zoom in further, so that Reach File Version 1 segments 05010007012, 05010007013, and 05010007014 are visible and cover most of the screen.*

- *Delineate a watershed for all tributaries feeding into Reach File Version 1 segment 05010007014. Select **Yes** to continue delineation.*

- *Add additional subwatersheds to the watershed.shp delineation for segments 05010007012 and 05010007013.*

- *Select **No** to end delineation after completing a subwatershed for each of these three segments.*

Watershed Delineations using Pacific Northwest Reach File Data

Stream reach data included in BASINS for the Pacific Northwest (PNW) region of the United States requires additional data processing before a watershed can be properly delineated and modeled. The PNW reach data is based on River Reach File, Version 2.1 specifically developed for this region. Data processing described below assist in simulating PNW reach file data in a manner similar to Reach File, V3.

1. Imported PNW reach data as a Reach File, V3 theme using the BASINS *Import* Tool. Procedures for importing Reach File, V3 data are presented in section 7.2.

2. Activate the PNW reach theme and select all stream reaches within a study area. Also select the downstream reach just beyond the study area.

3. Once all stream segments are selected, choose *Convert to Shapefile...* from the *Themes* menu to convert these stream reaches into their own shapefile. In the dialog box that appears, enter a file name for the reach file theme to be created. Save the file to the BASINS\DATA\<PROJECT NAME>\ RF3\ directory to make this file easy to find when needed (Screen 7.1.12).
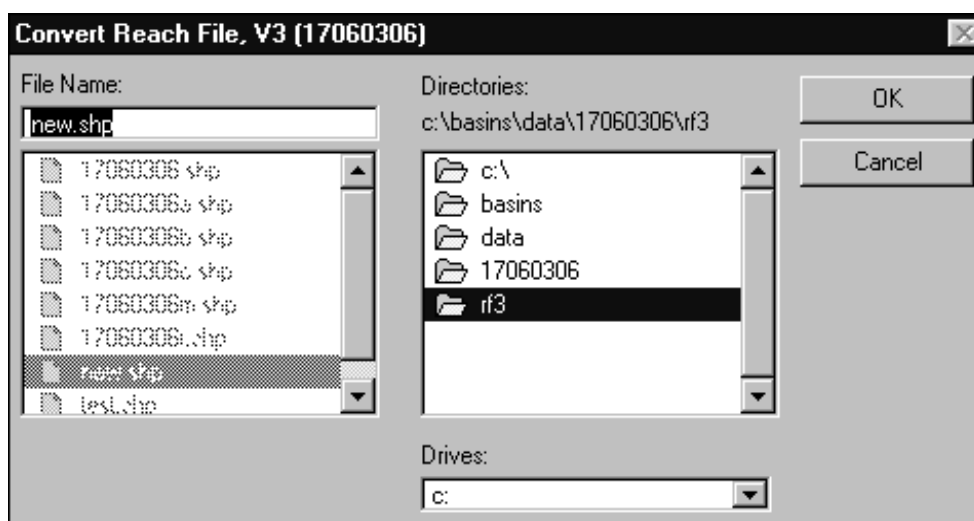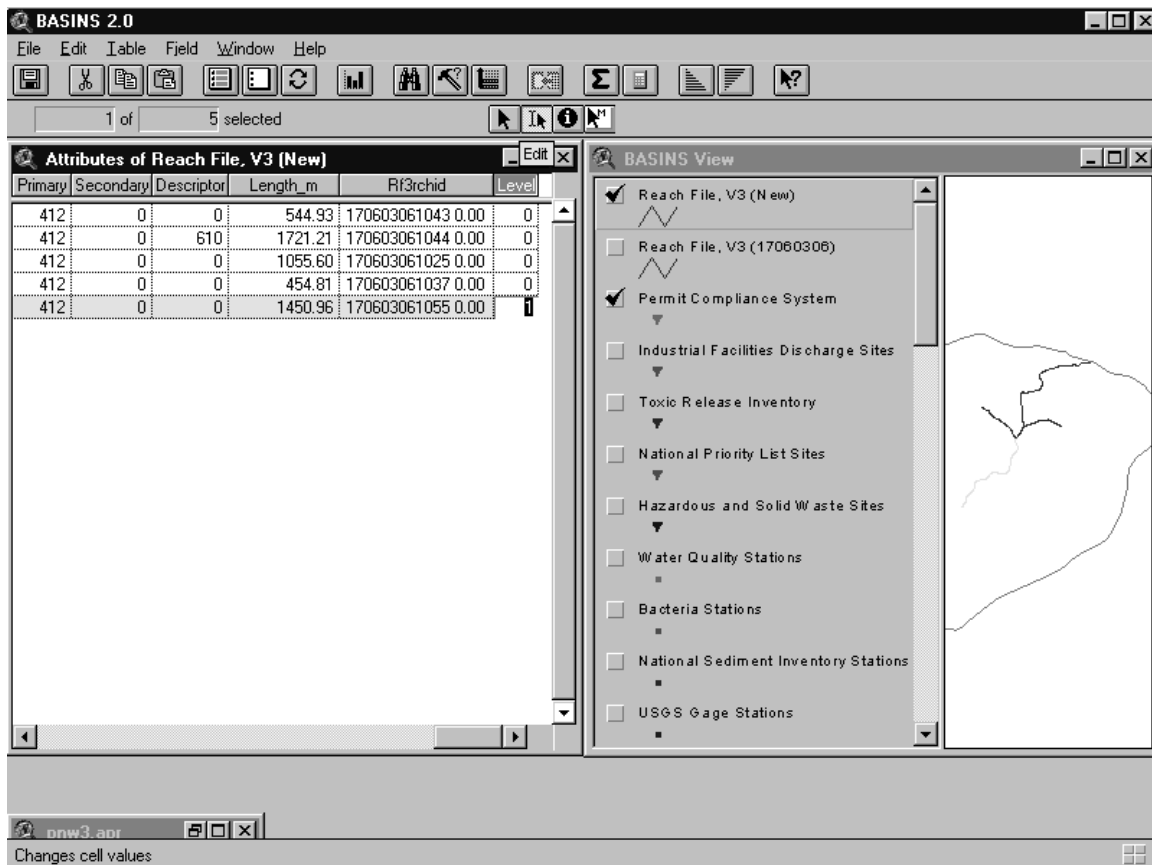

Screen 7.1.12

---

4. The next dialog box will prompt to "Add shapefile as theme to the view", select **NO**. The theme can not be directly added to a view because it needs to be "tagged" as a Reach File, V3 theme to properly function with BASINS GIS functions and modeling. This is accomplished by re-importing the new theme as a BASINS Reach File, V3 theme.

5. Import the new PNW theme using the BASINS *Import* tool (Refer to section 7.2). Turn off the original reach theme to clearly display the new theme in the view.

6. Once the new theme has been imported, the stream network has to be developed using the following steps below. The PNW reach data contains many stream reaches with multiple line segments. A reach is defined as the portion of a stream between two tributaries or the headwaters to the first confluence. A reach must contain a single segment to properly function with BASINS GIS tools and models.

   a. Use the **Select Feature** tool to identify reaches that include multiple segments. The multiple segments of a reach need to be merged to form a reach with a single segment.

   b. Select all segments within a single reach.

   c. From the *Themes* menu, select *Start Editing*

   d. From the *Edits* menu, select *Union Features*. The multiple segments will be merged into on segment.

   e. Select the segments in the next reach to be merged.

   f. Select *Union Features* from the *Edit* menu.

   g. Select *Stop Editing* from the *Themes* menu. Choose **YES** when prompted to save changes to theme.

   h. Repeat steps e to g until all reaches contain a single segment.

   i. View the attributes table for this theme to confirm that all reaches contain a single segment. The number of records (rows) in the attributes table should correspond to the proper number of reaches (single segment reaches) in the theme.

7. Assign a stream order to the network using the steps described below. Stream order is used to define the connectivity of the stream network which is required for modeling. As shown in Figure 7.1, this method is based on an increasing stream ordering number from downstream to upstream. In this example, Blacklick Creek is assigned a stream level of one for its entire length. All tributaries that discharge directly to Blacklick Creek are assigned a two. For example, Elk Creek is a second order stream. All tributaries directly discharging to Elk Creek are then assigned a three. The process continues to the upper most reach. Note that at a confluence the main stream channel identified by name (i.e., Blacklick Creek) in the reach file database is assigned the same stream level for its upstream and downstream segments.

   a. Activate the new RF3 theme's attribute table. From the *Windows* menu, select *Tile* to display the attributes table and BASINS view together.

   b. With the attributes table active, select *Start Editing* from the *Table* menu.

   c. Select *Add Field* from the *Edit* menu. A Field Definition dialog box will appear (Screen 7.1.13). Enter the parameters for the Name, Type, Width and Decimal Places fields according to the values shown in Screen 7.1.13. Select **OK** to continue. A new field labeled "Level" will be created in the table.

Figure 7.1

Screen 7.1.13

d. With the attribute table still in edit mode, return to the BASINS view and select the downstream reach in the new RF3 theme. The record that corresponds to this reach will also become selected in the table.

e. Return to the attributes table to enter an order number in the new "Level" field for this stream reach. A number is entered into the "Level" field by selecting the **Edit** button from the button bar and using the mouse to click on the record in the level field (Screen 7.1.14).

f. Repeat steps d and e until every reach is assign an order number. Proceed from downstream to upstream reaches to help properly assign stream order.

g. Select *Stop Editing* from the *Table* menu. Choose **YES** when prompted to save changes to theme.

Screen 7.1.14

8. The new theme containing the PNW reach file data is now ready to be used for watershed delineation and subsequent watershed characterization functions and modeling. Follow the watershed delineation methods discussed previously in this section. When prompted to select a Reach File, V3 theme, select the new RF3 theme and follow the standard watershed delineation procedures (Screen 7.1.15).
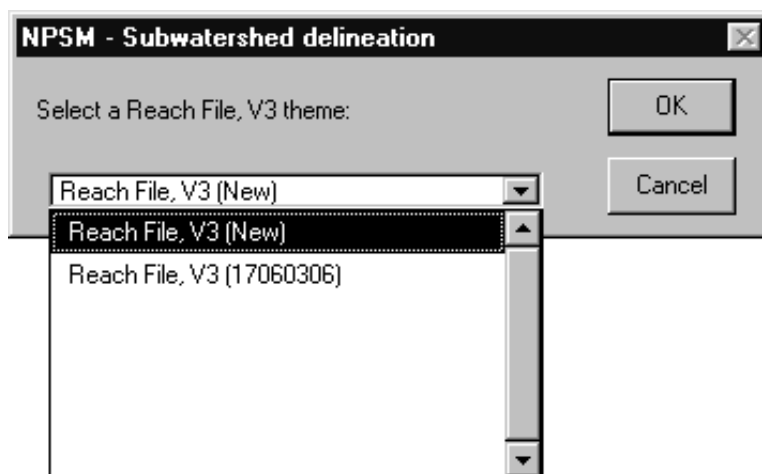
Screen 7.1.15

7.2   Import

Purpose

The BASINS *Import* tool gives the user the ability to import additional data sets and prepares the data to work properly with BASINS GIS functions and models.

Application

When conducting a watershed assessment using BASINS, the user will often want to add additional local or regional data to supplement or replace BASINS data products. The comprehensive data products included in BASINS were developed based on nationally available information and are suited for large-scale assessments. When dealing with localized small-basin analysis, however, higher-resolution data may be necessary to effectively capture the site-specific feature variability. The BASINS system is designed to provide a flexible GIS framework that allows users to easily integrate local environmental data to supplement or replace the national data products supplied with the program.

The BASIN *Import* tool functions like the standard "Add Theme" tool in ArcView; however, it performs additional functions to prepare the data for use with BASINS GIS functions and models. The BASINS *Import* tool is currently designed to import four data types—watershed boundaries, land use, Reach File Version 3, and Digital Elevation Model (DEM) data. As summarized in Table 7.2.1, the four data types must contain a number of required data attributes. Other data layers can be imported as a standard ArcView coverage. **To import a new data layer into BASINS, the data layer must have the same projection and datum (NAD83) as the data in the BASINS project.** The projection parameters for the project were selected during the initial BASINS data extraction and can be determined by using the *Lookup Project Parameter* menu. The BASINS *Import* tool allows the user to project the new data layer, if needed.

Table 7.2.1 Required Data Attributes

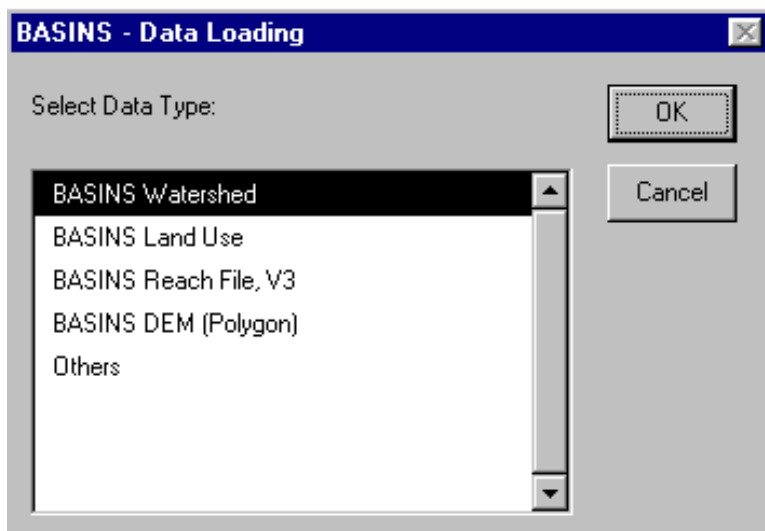| Data Type	Type of Coverage Required	Required Field and Its Attributes	Other Restrictions
Watershed Boundaries	Polygon	No attributes required	All watershed polygons must overlay an RF1 or RF3 line segment
Land Use	Polygon	Land use code field Land use area in m^2 Land use description field	User-imported land uses are currently configured to work only with NPSM and cannot be used with the Land Use Report generator
Digital Elevation Model (DEM)	Polygon	BASINS DEM data	This function is designed to work with the DEM data provided with BASINS.
Reach File, V3 (RF3)	Line Coverage	BASINS RF3 data	This function is designed to work with the RF3 data provided with BASINS.

Procedures

Key Procedures

✓ *Select Add Theme from the View menu*

✓ *Select one of the following from the dialog message box*

- *BASINS Watershed*

- *BASINS Land Use*

- *BASINS Reach File V3*

- *BASINS DEM (polygon)*

- *Other (This option corresponds to the standard "Add Theme" function in ArcView.)*

✓ *Select the file name to be imported*
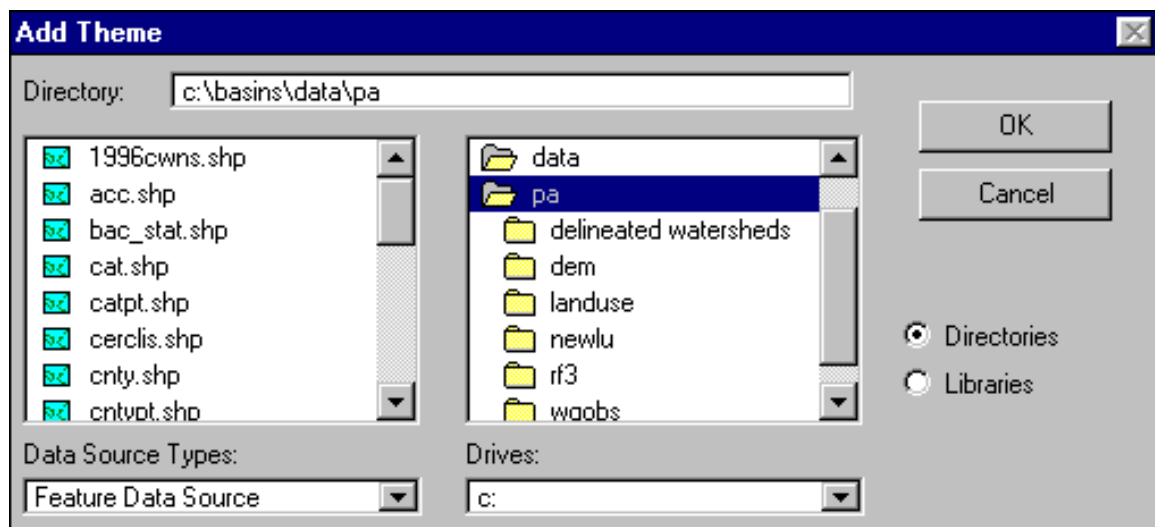

Importing Watershed Data

Subwatershed boundaries delineated within a cataloging unit(s) are often required for small-basin analysis. Users can import their own subwatershed themes using the BASINS *Import* tool. The *Import* tool assigns each subwatershed a unique identification number that is used for BASINS GIS functions and modeling.

1. Select *Add Theme* from the *View* menu or use the **Import** button.

2. Select "BASINS Watershed" from the data type message box (Screen 7.2.1).

3. Select the shape file name to be imported (Screen 7.2.2).

4. A dialog box will provide an option to project the data theme to be imported. If the data are not in the same map projection as the BASINS project, select OK to project the data. Refer to Section 4.2, Data Extraction, for an introduction to map projections.

5. The final dialog will prompt you to select a reach file (Screen 7.2.3). Select "Reach File, Version 1" or "Reach File, Version 3" depending on the stream network to be used for NPSM modeling. A unique ID will be assigned to each subwatershed based on the RF1 or RF3 segment that it contains. This unique subwatershed ID is used for watershed characterization report functions and modeling.

BASINS - Data Loading

Select Data Type:

- BASINS Watershed
- BASINS Land Use
- BASINS Reach File, V3
- BASINS DEM (Polygon)
- Others

OK

Cancel

Screen 7.2.1

Add Theme

Directory: c:\basins\data\pa

- 1996cwns.shp
- acc.shp
- bac_stat.shp
- cat.shp
- catpt.shp
- cerclis.shp
- cnty.shp
- cntypt.shp

- data
- pa
  - delineated watersheds
  - dem
  - landuse
  - newlu
  - rf3
  - wqobs

OK

Cancel

● Directories
○ Libraries

Data Source Types:

Feature Data Source

Drives:

c:

Screen 7.2.2

NPSM - Subwatershed delineation

Select a reach file:

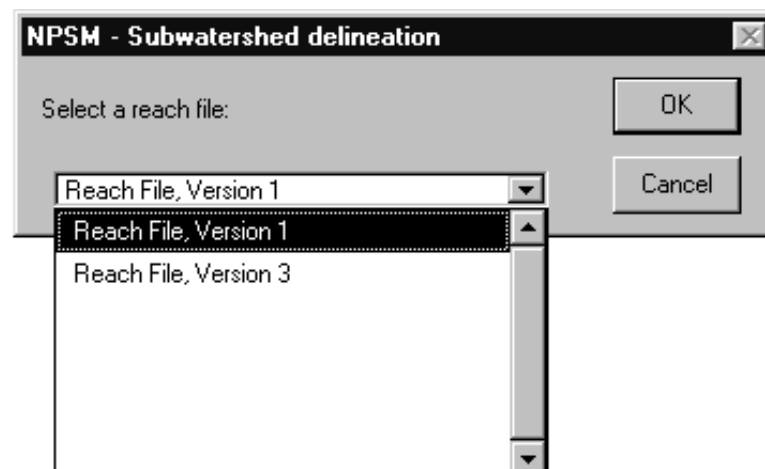Reach File, Version 1

Reach File, Version 1

Reach File, Version 3

OK

Cancel

Screen 7.2.3

Example:

Hydrologic unit boundaries delineated by state or county agencies can be imported directly into BASINS and used with BASINS tools. In this example hydrologic unit boundaries delineated by the Virginia Division of Soil and Water Conservation were reprojected and imported into a BASINS project file for use with *NPSM* (Screen 7.2.4).
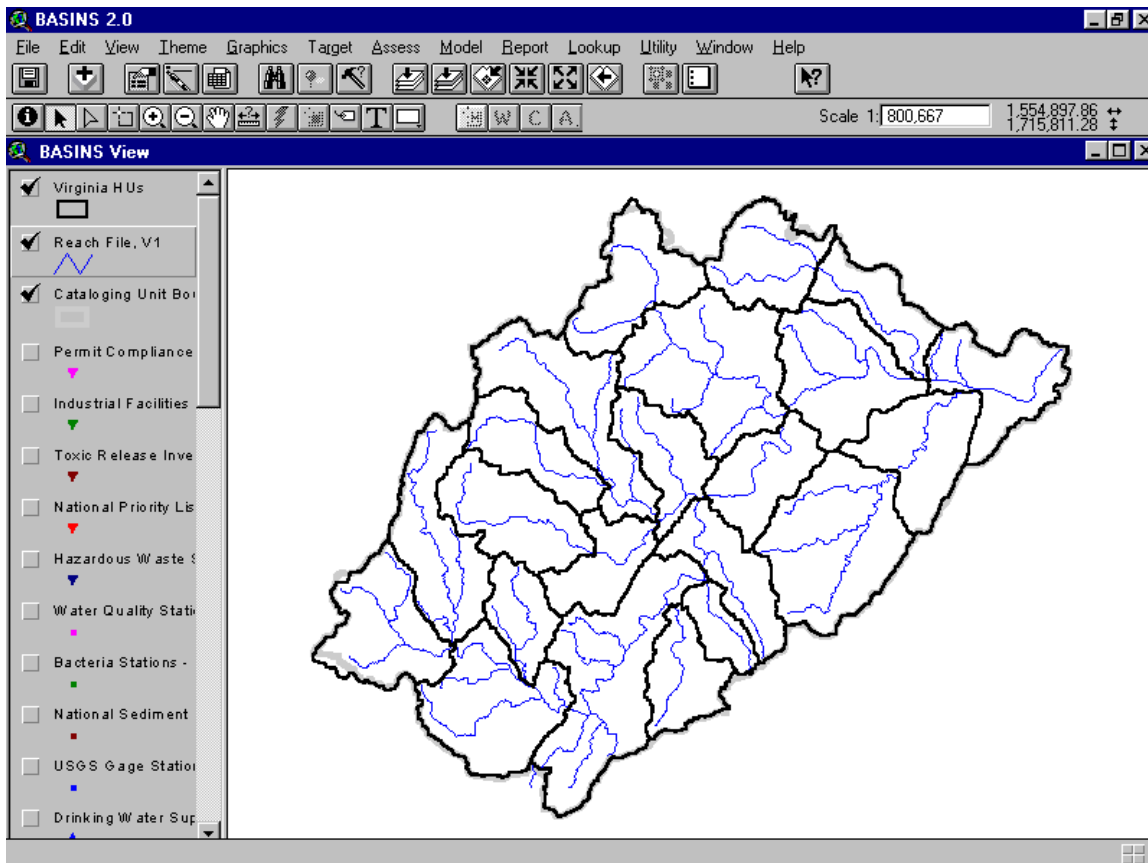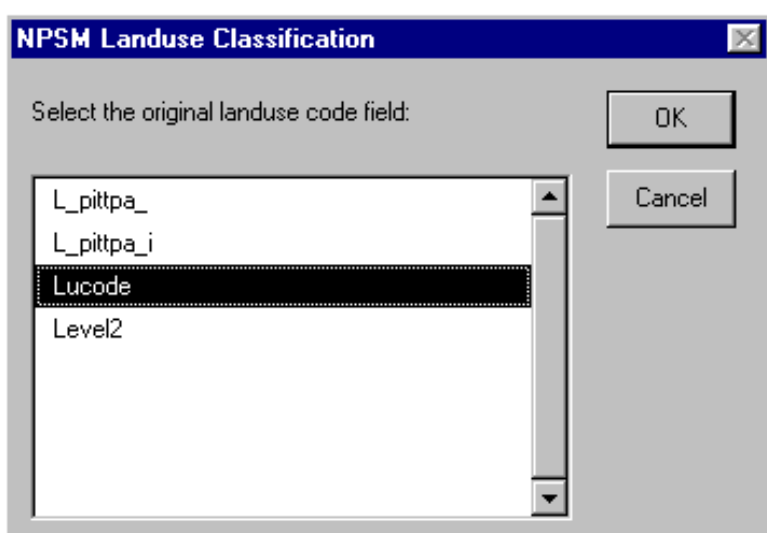

Screen 7.2.4

Importing Land Use Data

If a new land use data layer will be used for modeling, it must be imported using the BASINS land use *Import* tool. The following steps are used to prepare the new data set for future land use reclassification and modeling. Refer to Section 7.3 of the manual for additional information on land use reclassification.

1. Select *Add Theme* from the *View* Menu or use the **Import** button.

Tip: Land use data imported by a user can be used by **NPSM** but is not available for the **Land Use Distribution Report** function.

---

2. Select "BASINS Land Use" from the data type dialog box (Screen 7.2.1).

3. Select the land use file name to be imported.

4. A dialog box will provide an option to project the data theme to be imported. If the data are not in the same map projection as the BASINS project, click **OK** to project the data. Refer to section 4.2, Data Extraction, for an introduction to map projections.

5. Following the projection dialogs a series of windows will follow prompting the user to specify names of existing land use code and description fields. Declaration of these new fields is required to run *NPSM* and to reclassify land uses.

6. A message box will prompt you for the original land use code field. Select the land use code field name from the list and click **OK** (Screen 7.2.5).

Screen 7.2.5

7. Enter a new land use code field name and click **OK** (Screen 7.2.6). Creating a new field name protects the original data field.
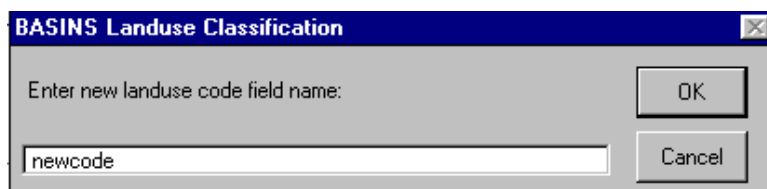
Screen 7.2.6

8. Select the existing land use description field and click **OK** (Screen 7.2.7). The descriptive field contains the name of the land use classification, such as residential or deciduous forest. If the new land use data do not contain a descriptive field, click **Cancel** to skip this step. Otherwise, enter a new land use description field name and click **OK** (Screen 7.2.8).
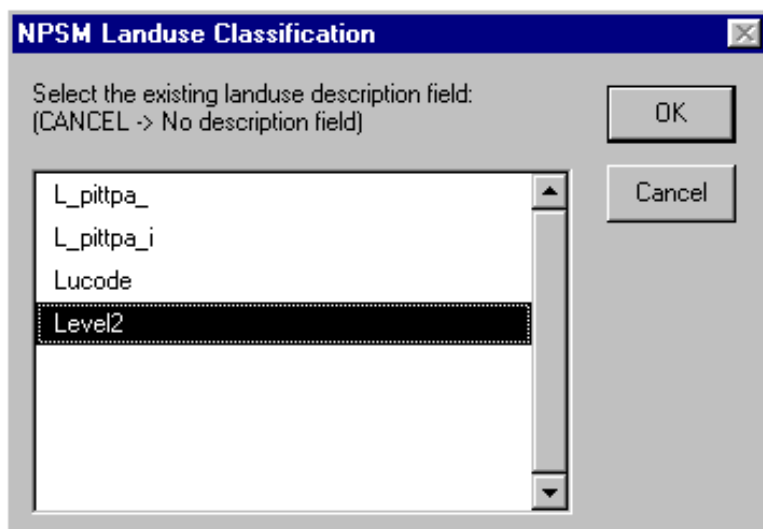
Screen 7.2.7

Screen 7.2.8

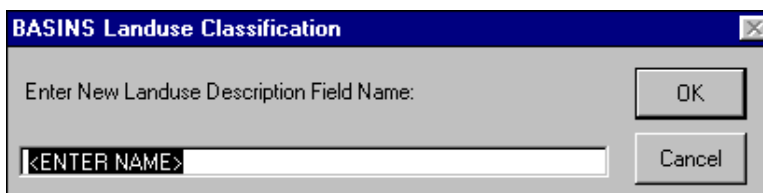9. The last screen prompts you to enter a land use group number. If the land use is a single tile, click **Cancel**. The group number is used to identify tiles that belong to the same land use data layer.

10. The new land use theme is added to the BASINS View; however, it is unclassified. The new land use can be classified using the legend editor. Select the **Load** button within the legend editor to load default land use legends.

Importing Reach File Version 3 Data

The Reach File, Version 3 *Import* tool assigns a unique name to the theme and creates a default legend. This tool is designed to import Reach File Version 3 data that were extracted from the BASINS CD or web archive. These data are already in the proper projection and datum. Extracted Reach File data are located in a folder named "RF3" under the project data directory. The reach files are grouped by cataloging numbers.

1. Select *Add Theme* from the *View* menu or use the **Import** button.

2. Select "BASINS Reach File V3" from the data type dialog box (Screen 7.2.1).

3. Select the file name to be imported (Screen 7.2.2).

Importing Digital Elevation Model (DEM) Coverages

The DEM *Import* tool assigns a unique theme name to the coverage and builds a default DEM legend to display the data. DEM data that were extracted from the BASINS CD or web archive can be directly imported into the BASINS View using this tool. These data are already in the proper projection and datum. DEM data extracted from the BASINS CD are located in a folder named "DEM" in the project data directory.

1. Select *Add Theme* from the *View* menu or use the **Add Theme** button.

2. Select "BASINS DEM (Polygon)" from the data type dialog box (Screen 7.2.1).

3. Select the file name to be imported (Screen 7.2.2).

TUTORIAL

- *Import the Reach File Version 3 theme 05010007 and the DEM theme 05010007 from the tutorial directory.*

7.3 Land Use Reclassification

Purpose

BASINS ***Land Use Reclassification*** tool is used to group detailed land use classes, based on their code and descriptions, into broad categories. The land use reclassification tool can modify the existing land use theme(s) or create new themes with different classifications to reflect alternative scenarios.

Application

Reclassification of land use is often required to update existing land use data files, to group land use types, or to evaluate water quality impacts or management alternatives based on changes to land use over time. For example, changes in water quality due to urbanization can be accounted for by converting agricultural or forested land that is likely to be developed into an urban land classification. In addition, land use classes that have similar characteristics can be grouped into a single classification to simplify modeling. The main application of this tool is to support nonpoint source modeling.

Procedures

Key Procedures

✓ *Import land use using BASINS Import Land Use tool*

✓ *Activate the land use theme*

✓ *From the Utility menu select Re-classify Land Use*

✓ *Select an existing land use code(s) to be reclassified*

✓ *Assign a new code and description*

---

1. Prior to being reclassified, a land use theme must be imported using the ***BASINS Import Land Use*** tool. This includes the existing BASINS land use themes included in the project. The BASINS land use theme data files must be copied, renamed, and then imported using the ***Import Land Use*** tool. The application and procedures for using BASINS ***Import Land Use*** tool are described in Section 7.2 of this manual.

Tip: *If the land use theme that is currently active has a scenario joined to it, you will be prompted to use the Unjoin Scenario tool first.*

---

2. Activate the land use theme to be reclassified by clicking the cursor on the theme name. Check the box next to the theme name to display the theme on the BASINS View.

3. From the *Utility* menu, select "Re-classify Land Use" (Screen 7.3.1).

Screen 7.3.1

4. The reclassification dialog will appear on the screen (Screen 7.3.2). In the left box there will be a list of land use codes. These are the original land use codes. Click on one and its description will appear below the box. To add a land use code to a reclassified category select a code or multiple codes (hold Shift and click other codes for multiple selection), and then click the button with the arrow pointing to the right. The codes should appear in the right box.

5. Below the right box are two text entry fields. Use the "landuse Code" field to enter a new numerical code for the codes listed above. In the "Landuse Description" field enter a new description for this new land use category.

6. When finished with the current classification click on the "Lock Changes" button. The new code will reappear in the left box. If you click on the new code, the new description will appear below the left box.
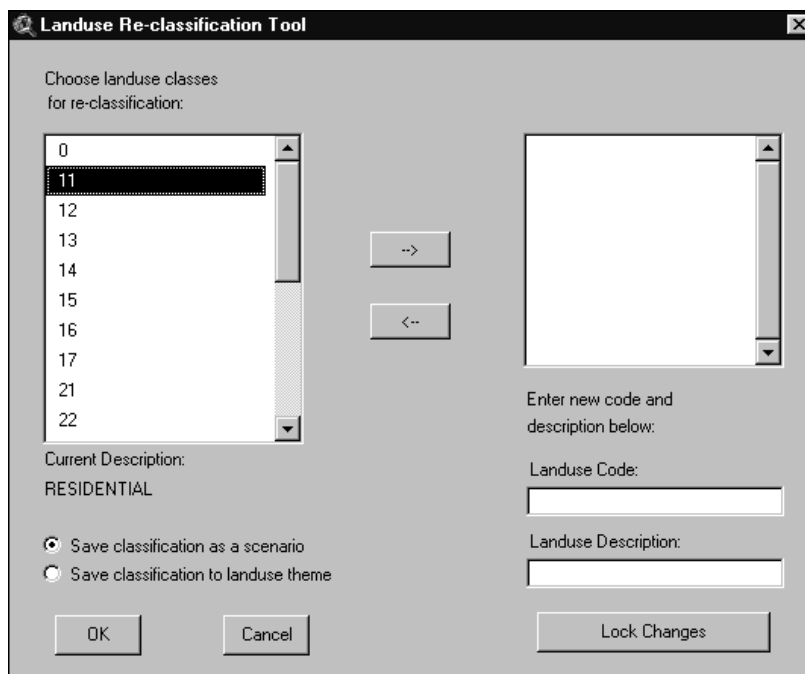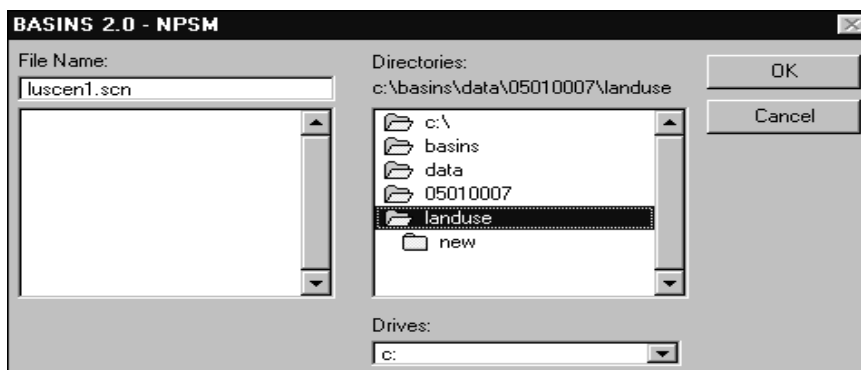
Screen 7.3.2

> ***Tip:*** *Once "Lock changes" has been clicked it is not possible to go back to the original classification unless you quit and begin again.*

---

7. Repeat steps 4 through 6 until reclassification is complete.

8. Below the left box are two radio buttons labeled "Save classification as a scenario" and "Save classification to landuse theme". Select one of these options and Click **OK** button to save changes.

   When the "Save classification to landuse theme" option is selected, the new classification is saved to the original attribute table. This option is not recommended if multiple scenarios will be considered. Selecting the "save classification as a scenario" option will save the reclassified landuse into a new database. This option allows the user to save multiple scenarios for an area without altering the original landuse information.

9. When saving as a scenario you will be prompted to enter a filename (Screen 7.3.3). Enter a filename and click **OK**. The scenario file will be saved to a user selected directory. The file extension is .scn (for scenario).

10. BASINS returns to the BASINS View. The classification changes may only be immediately noticeable if the "Save classification to landuse theme" option was exercised. If the "Save classification as a scenario" option was used then the changes will only be apparent when running **NPSM**.

Screen 7.3.3

Tip: The reclassification land use data will be used by NPSM but is not available for the **Land Use Distribution Report** function.

---

11. Enter scenario information in the next dialog box. (Screen 7.3.4)
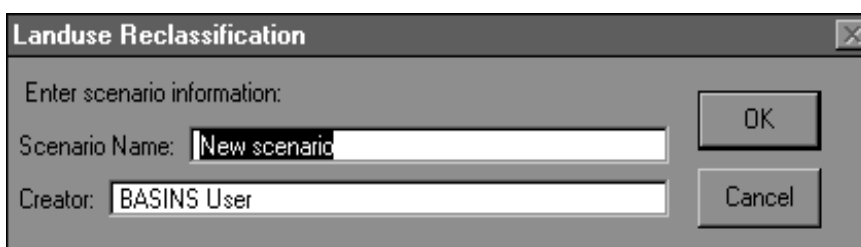
Screen 7.3.4

Tip: Once the selected Land Uses have been reclassified, the **NPSM** model will need to be rerun to incorporate these changes into the model.

- Modify the percent perviousness for each landuse if necessary (Screen 7.3.5). Click OK to save the changes and complete the reclassification.

Screen 7.3.5

TUTORIAL
• Activate the "Newlu.shp" Theme (do not select an area on the theme).
• Select "Re-classify Land Use" from the Utility menu.
• Select existing land uses 11 through 17 from the list by clicking on them one at a time (Screen 7.3.2).
• Enter "10" for the New Land Use code.
• Enter "Urban or Built-up" for the new description name.
• Select "save classification as a scenario" and click **OK**.
• Enter a file name for the scenario and save to the land use directory (Screen 7.3.3).
• The new land use classification scenario file can be selected while executing **NPSM** from BASINS.

7.4 Water Quality Observation Data Management

Purpose

The *Water Quality Observation Data Management* utilities can be used to access and manipulate the water quality observation database of the BASINS system. They can be used to add new stations to the database, delete unnecessary stations, relocate misplaced stations, and incorporate new water quality observation time-series data. An export utility is also included to provide the capability to generate a text report of water quality observation data for selected water quality monitoring stations. This text report can then be opened in the post processor and visualization tools along with modeling results..

Application

The *Water Quality Observation Data Management* utilities include a palette of tools and two utilities—the Water Quality Observation Station Management tools, the Append Water Quality Observation Data utility, and the Export Water Quality Observation Data utility.

The Water Quality Observation Station Management tools operate only on the water quality observation stations' primary attributes. A default point data layer of water quality stations was created from the USEPA STORET database. Only a limited set of stations was selected from STORET to be included in this layer. The selection criteria included the availability of sufficient time series of raw water quality observation data to allow for trend analysis and assessment of water quality conditions over time. Other considerations included the size of the overall water quality observation file and the need to obtain a balanced national coverage. With the station management tools, the user can enhance the station layer by updating the file and adding stations not included in the original file.

The Append Water Quality Observation Data utility can be used to add new water quality observation time series into the database for a given station. The basic database provided with BASINS is prepared from the USEPA STORET database and contains observation data for 106 parameters. The water quality observation data are collected by a number of organizations including individuals, contractors, universities, water laboratories, and federal, state, and interstate agencies.

> ***Tip:*** *The water quality observation data of a particular monitoring station are stored as a DBF file with a filename the same as the 8-digit (string) name of the cataloging unit where the station is located. The observation data for several monitoring stations within the same 8-digit watershed are stored in the same file. The DBF file is stored in the WQOBS subdirectory under the user's DATA directory.*

For this utility to function properly, the file that contains the new data to be appended should be in the correct format. A single file may include new data for several stations. The utility will ensure that the new data will be appended to the appropriate observation DBF files in the DATA\WQOBS directory.

By providing users the capability to add new water quality stations and update observation data, the BASINS data system can be enhanced and expanded to include more local data and therefore increase the usefulness of the system to state and local watersheds and water quality analysts.

The Export Water Quality Observation Data utility can be used to generate a text file that contains a report of observation time-series data on selected water quality parameters for selected water quality monitoring stations. The exported text file can be used in several applications. Model calibration is a key application using the NPSM postprocessor or other commercially available spreadsheets. Another key application is for analysis of trends and changes over time at a given location (involving a single station or multiple stations). The third key application is for comparative analysis of water quality conditions at various locations. For example, the user can compare several monitoring locations (upstream and downstream of a water body) to evaluate the contribution of a point or nonpoint source.

Procedures

Key Procedures

Water Quality Station Management Tools

✓ Activate and check the check box of the Water Quality Observation Station theme

✓ Select the appropriate tool from the drop-down palette of Water Quality Station Management tools

✓ Edit the geographical location or attribute data of the water quality monitoring station

Append Water Quality Observation Data

✓ Activate and check the check box of the Water Quality Observation Station theme

✓ Under the Utility main menu, select the Append Water Quality Observation Data submenu

✓ Enter the filename of the file to append

Export Water Quality Data Observation

✓ Activate and check the check box of the Water Quality Observation Station theme

✓ Select the station(s) for which the export file will be generated

✓ Under the Utility main menu, select the Export Water Quality Observation Data submenu

✓ Select the water quality parameter(s) in the select box

✓ Enter the filename of the export file

**Adding New Water Quality Monitoring Stations - Operation Steps**

1. In the BASINS View table of contents (Screen 7.4.1), click the name of the Water Quality Observation Station theme to make it active. Check its check box to display the point locations of the stations in the View window. This will activate the icon for the drop-down pallette of Water Quality Station Management Tools. The drop-down menu includes the four Water Quality Station Management Tools as follows:

   "A" for adding a new station
   "M" for moving an existing station
   "E" for editing primary attributes of an existing station.
   "D" for deleting an existing station
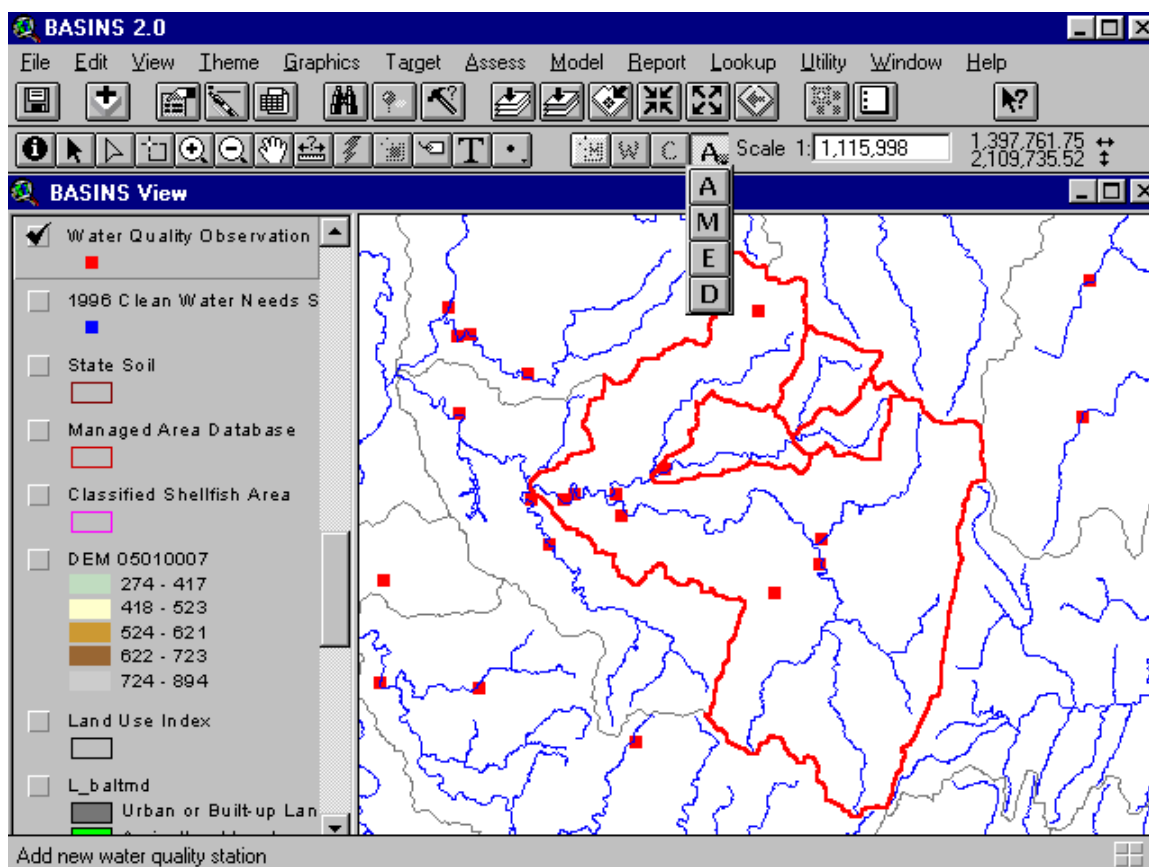
Screen 7.4.1

2. From the drop-down palette, select the **Add Station** tool denoted by an "A".

3. By using the mouse, click a point in the View window to indicate the location of the new station. In the pop-up table that appears, enter the primary attributes of the new station in the appropriate text fields. Initial values for some of the attributes such as the ID, state code, current date, and data processing code (Bproc field), are already provided in the pop-up table (Screen 7.4.2). The data

processing code indicates the last processing function performed on the selected station and include the following:

"A" for adding a new station
"M" for moving an existing station
"E" for editing primary attributes of an existing station.

Screen 7.4.2

4. Click **OK** to save the new station and its attributes; otherwise, click **Cancel**.

Tip: *When you are entering the primary attributes of the new station, all text fields in the pop-up table should be filled out to activate the OK button which will allow you to save the new station attributes. When no data are available for a particular text field, a space can be entered instead. Note that all text fields except for the Comments field and the other fields with predetermined values have already been initialized with a space.*

---

5. Continue adding as many stations as needed. Otherwise, select another Water Quality Data Management Tool from the drop-down palette or another ArcView or BASINS tool to deactivate the **Add Station** tool.

TUTORIAL

- *Click the theme Water Quality Observation Station to make it active (Screen 7.4.1).*

- *Check its check box to display the point locations of the observation stations in the View Window.*

- *Select the Add Station Tool in the drop-down palette of Water Quality Station Management Tools.*

- *Using the mouse, click a point in the View window to add a new station. For this example, the new station was added at a point that has coordinates of X = 1,422,269 and Y = 2,089,066. Enter the values for the primary attributes of the new station in the pop-up table that appears. You may use the values shown in Screen 7.4.3. Note that initial values for some of the parameters are already initialized (Screen 7.4.2). Click OK to save the new station and its attributes. Note that the added station is now shown in the View Window.*

Attributes of New Water Quality Observation Station

Enter Attribute information:

Id	9999
Agency	StateX
Agency_cod	XY
Station	StationY
St_depth	
State	36
Lat	
Long	
Type	/TYPA/AMBNT/STREAM
Location	BlackLick Creek
Cu	05010007
Seg	024
Mile	
Onoff	On
Date	Wed Mar 25 18:02:34 1998
Bproc	A
Comments	New station

OK

Cancel

Screen 7.4.3

Editing Primary Attributes of Existing Water Quality Monitoring Stations - Operation Steps

1. In the BASINS View table of contents (Screen 7.4.1), click the name of the Water Quality Observation Station Theme to make it active. Check its Check Box to display the point locations of the stations in the View Window. This will activate the icon for the drop-down pallette of Water Quality Station Management Tools.

2. From the drop-down palette, select the **Edit Station** tool denoted by an "E".

3. By using the mouse, select an existing station in the BASINS View window. In the pop-up table that appears (Screen 7.4.4), edit the primary attributes of the existing station as needed.

Water Quality Observation Stations

Record 502 of 502

Id	9999
Agency	State Ag
Agency_cod	0
Station	New Station Y
St_depth	0
State	36
Lat	0
Long	0
Type	/TYPA/AMBNT/STREAM
Location	BlackLick Creek
Cu	05010007
Seg	020
Mile	0
Onoff	Off
Bstat_id	New Station Y+State Agency X
Bproc	A
Comments	New station

OK

Cancel

Screen 7.4.4

4. Click **OK** to save the new station and its attributes; otherwise, click **Cancel**.

> *Tip:*   *The primary attributes of an existing station that contains no data (blank field) will cause the OK button of the pop-up table to remain inactive. If no new data are available to replace these blank fields, enter spaces instead to activate the OK button.*

5. Continue editing as many stations as needed. Otherwise, select another Water Quality Data Management Tool from the drop-down palette or another ArcView or BASINS tool to deactivate the **Update Station** tool.


TUTORIAL

- *Select the Edit Station Tool in the drop-down palette of Water Quality Station Management Tools.*

- *Select the station that you just added with the previous tool. A pop-up table that contains the primary attributes of this station appears. Note that it contains the attributes you entered with the previous tool.*

- *You may now edit the attributes. You may use the values shown in Screen 7.4.4.*

- *Click **OK** to save the edited attributes.*

Moving (Updating Location) of Existing Water Quality Monitoring Stations - Operation Steps

1. In the BASINS View table of contents (Screen 7.4.1), click the name of the Water Quality Observation Station theme to make it active. Check its check box to display the point locations of the stations in the View window. This will activate the icon for the drop-down pallette of Water Quality Station Management tools.

2. From the drop-down palette, select the **Move Station** tool denoted by an "M".

3. By using the mouse, select an existing station in the BASINS View window. A place marker drawn around the selected station will indicate that the station is ready to be moved (Screen 7.4.5). Using the mouse, move or drag the station to the desired new location.

4. In the dialog box that appears, click **Yes** to save the new location; otherwise, click **No**. Click **Cancel** if you want to continue dragging the same station to another location.

5. Continue moving as many stations as needed. Otherwise, select another Water Quality Data Management Tool from the drop-down palette or another ArcView or BASINS tool to deactivate the **Move Station** tool.

TUTORIAL

- *Select the Move Station tool in the drop-down palette of Water Quality Station Management Tools.*

- *Select the new station that you added in the previous tool. A place marker around the selected station is drawn (Screen 7.4.5).*

- *By holding the mouse down, drag the station to its new location. For this tutorial, the station was moved to a location just downstream of the original location (Screen 7.4.6).*
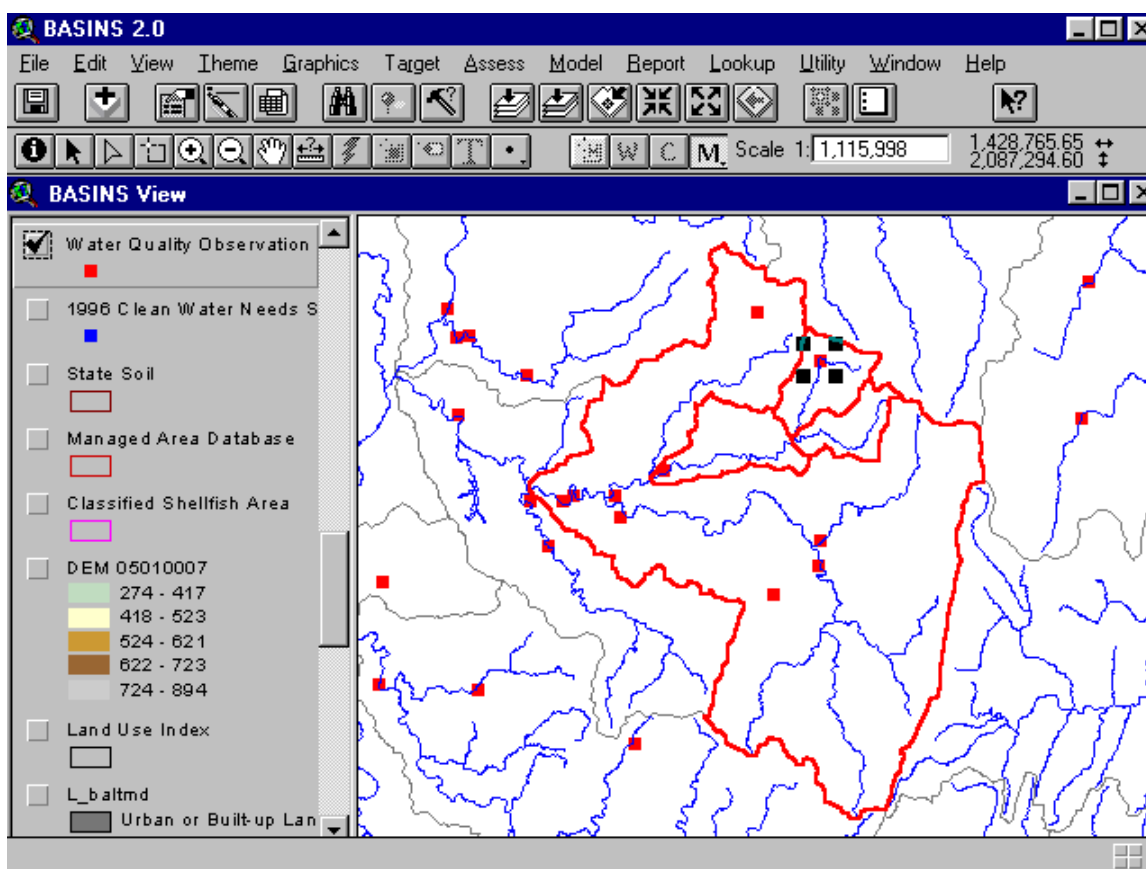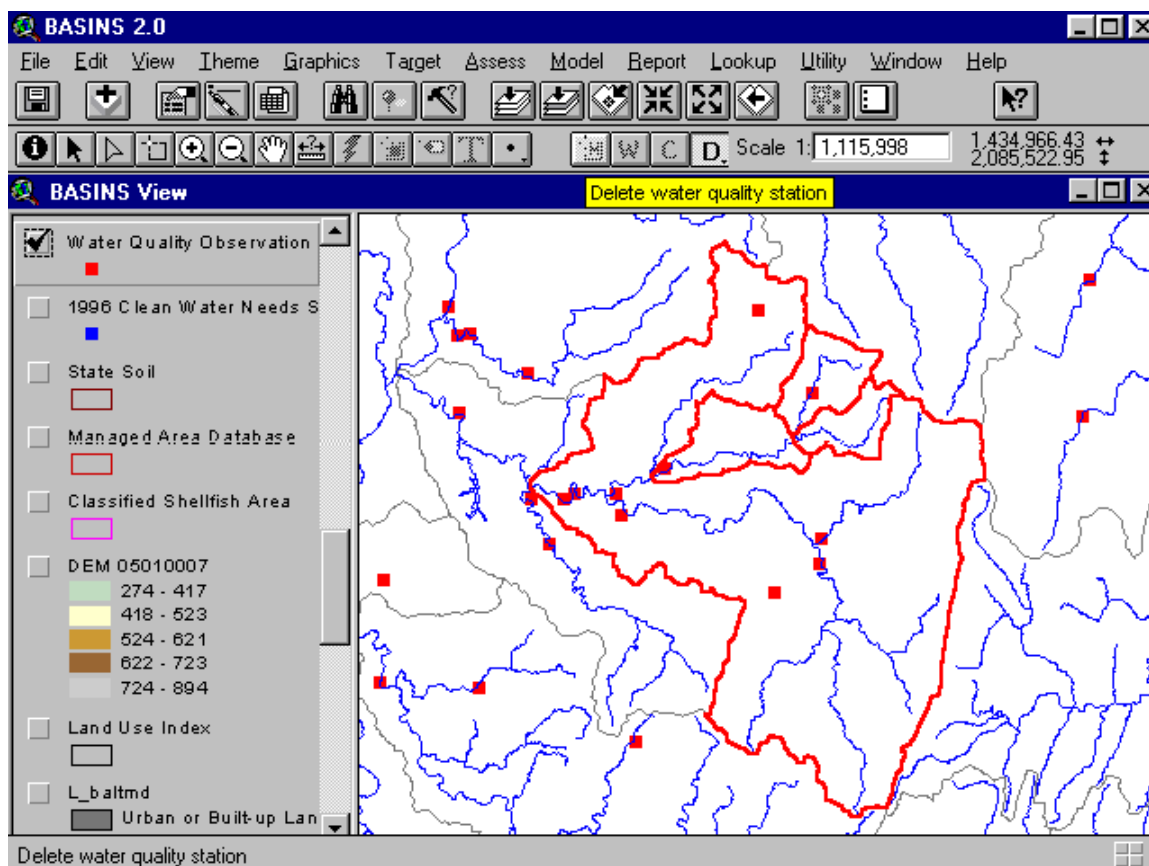

Screen 7.4.5

Deleting Existing Water Quality Monitoring Stations - Operation Steps

1. In the BASINS View table of contents (Screen 7.4.6), click the name of the Water Quality Observation Station theme to make it active. This will activate the icon for the drop-down pallette of Water Quality Station Management Tools.

2. From the drop-down palette, select the **Delete Station** tool denoted by a "D".

3. By using the mouse, select an existing station in the View Window.

Tip: Use Delete Station with caution since you might accidentally delete the wrong station, particularly when several stations are very close to one another. Use the ArcView Zoom tool to increase the resolution and clearly identify the station to be eliminated before you initiate the "Delete Station" process.

---

4. In the dialog box that appears, Click **Yes** to delete the station; otherwise, Click **No**.

Screen 7.4.6

5. Continue deleting as many stations as needed. Otherwise, select another water quality data management tool from the drop-down palette or another ArcView or BASINS tool to deactivate the **Delete Station** tool.


TUTORIAL

- *Select the Delete Station Tool in the drop-down palette of Water Quality Station Management Tools. .*

- *Use the ArcView Zoom tool to increase the resolution of the view and then select the station that you moved in the previous tool*

- *In the dialog box that appears, click Yes to delete the station.*

- *At this point, your database should be back to its original form (that present just before you used the station management tools).*

Append Water Quality Observation Data Utility - Operation Steps

1. In the BASINS View table of contents (Screen 7.4.7), click the name of the Water Quality Observation Station theme to make it active. Check its check box to display the point locations of the

stations in the View window. This will activate the submenu *Append Water Quality Observation Data* under the main menu *Utility*.
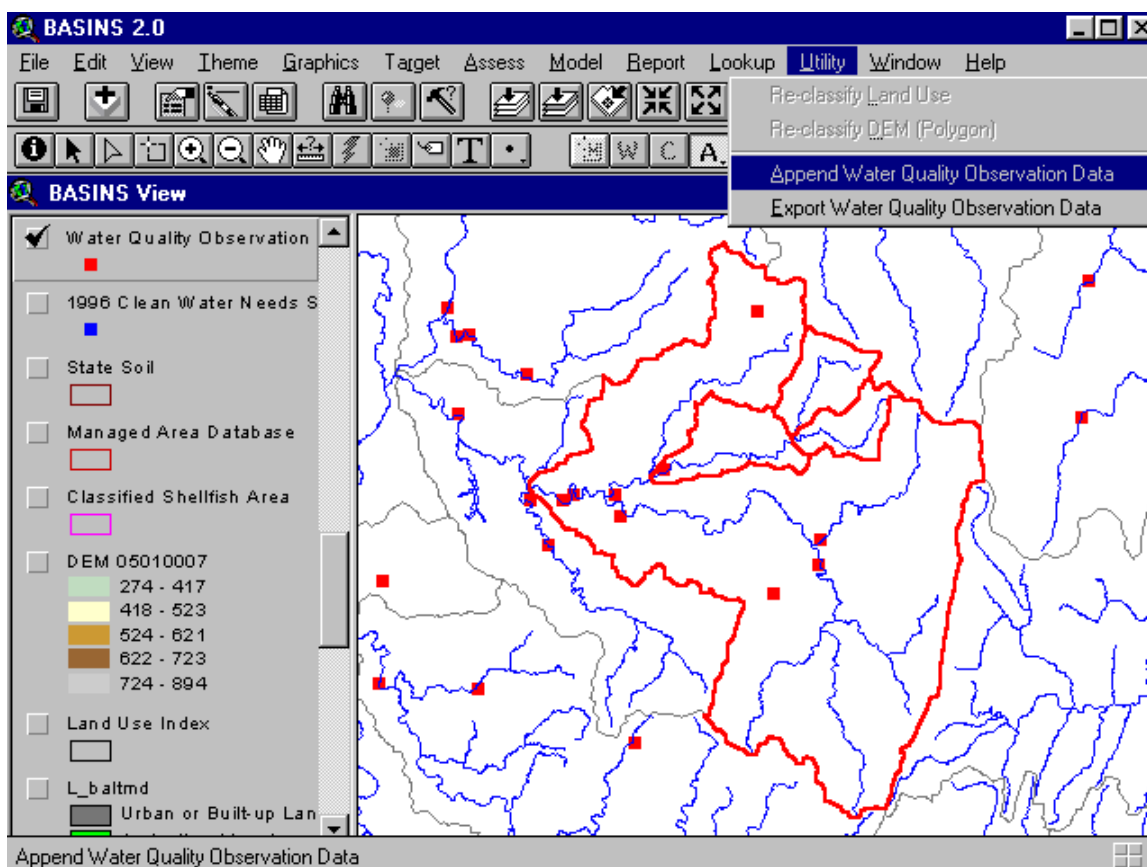
Screen 7.4.7

2. Select the submenu *Append Water Quality Observation Data* under the main menu *Utility*.

3. In the file dialog box that appears (Screen 7.4.8), enter the name of the file that contains the new data to append. Click **OK** to append the file; otherwise, click **Cancel**.
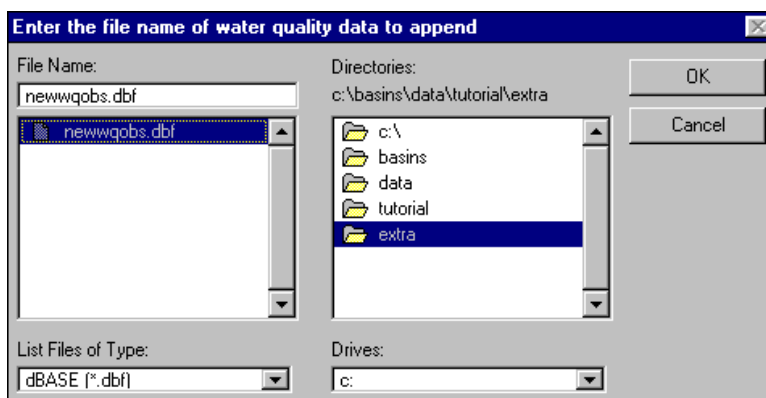
Screen 7.4.8

> *Tip:* The Append utility requires that the file to be appended be in the correct format. The new file should be in DBF format and must contain nine fields for the station name, agency, 8-digit cataloging unit code (CU) in character format, date, time, depth of measurement, STORET parameter character code (PARM), numeric value of the measurement, and any additional comments (Screen 7.4.9).

Station	Agency	Cu	Date	Time	Depth	Parm	Value	Comments
0169600113	01696	05010007	970330	1210		00010	15.00000	Data1
0169600114	01696	05010007	970616	1120		00010	28.50000	Data2
0169600115	01696	05010007	971005	1200		00010	12.00000	Data3
0169600116	01696	05010007	971014	1045		00010	9.00000	Data4

Screen 7.4.9

TUTORIAL

- Click the theme Water Quality Observation Station to make it active (Screen 7.4.7).

- Check its check box to display the point locations of the observation stations in the View Window.

- Select the submenu Append Water Quality Observation Data under the main menu Utility.

- Enter the name of the file as shown in Screen 7.4.8 and click OK to append the file. The file to append for this tutorial is saved in \BASINS\Data\Tutorial\Extra.

- A pop-up table (Screen 7.4.10) will appear, confirming that the file has been appended to the appropriate BASINS DBF files.

- Click OK to end the tool.

The following tables have been updated

```
05010007.dbf
05010007.dbf
05010007.dbf
05010007.dbf
```

OK

Screen 7.4.10

Export Water Quality Observation Data Utility - Operation Steps

1. In the BASINS View table of contents (Screen 7.4.11), click the name of the Water Quality Observation Station theme to make it activ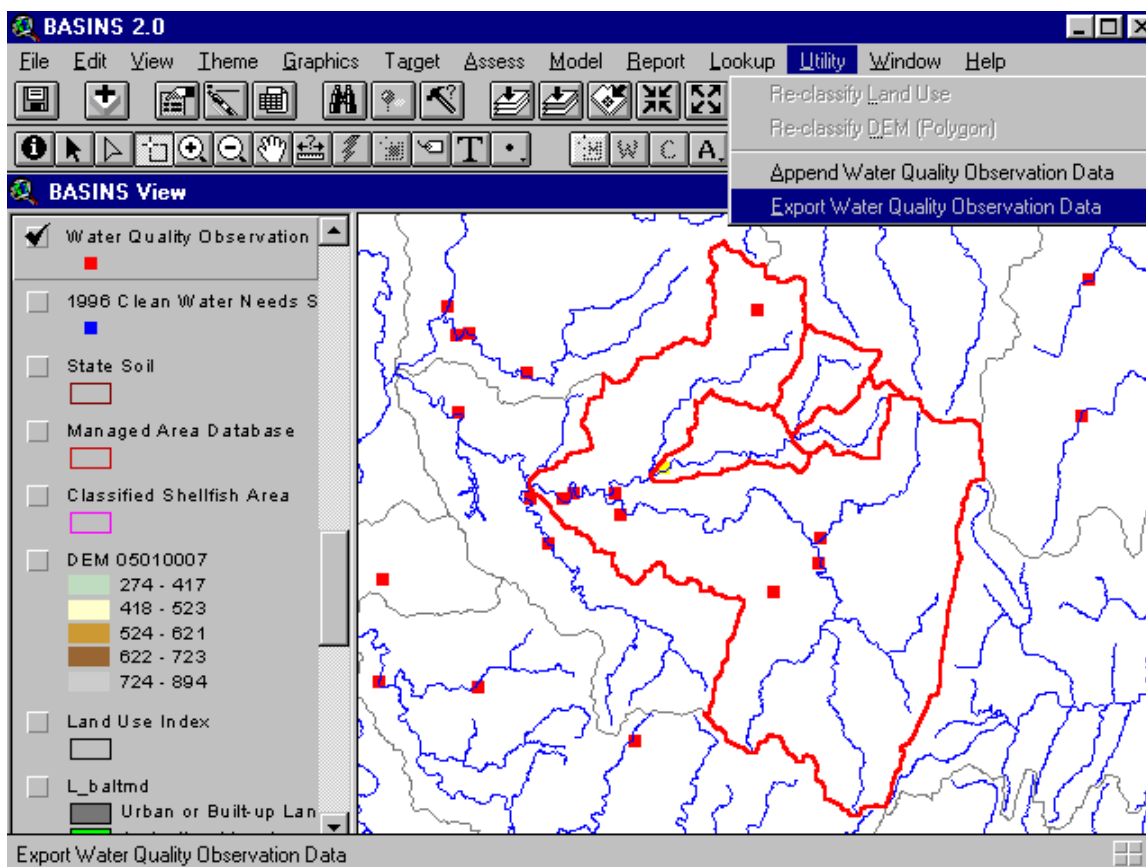e. Check its check box to display the point locations of the stations in the View window. This will activate the submenu Export Water Quality Observation Data under the main menu *Utility*.

Screen 7.4.11

2. Activate the **Select Feature** tool and select (by clicking or dragging a box) the stations based on which the export file will be generated.

3. Select the submenu *Export Water Quality Observation Data* under the main menu *Utility*.

4. In the select box that appears (Screen 7.4.12), select the water quality parameter(s). To select more than one parameter hold down the SHIFT key and select as many water quality parameters as needed.

5. Click **OK** to continue; otherwise, click **Cancel**.

6. In the file dialog box that appears (Screen 7.4.13), enter the name (with the extension if desired) of the file that will contain the generated report. Click **OK** to save the report into the file; otherwise, click **Cancel**.
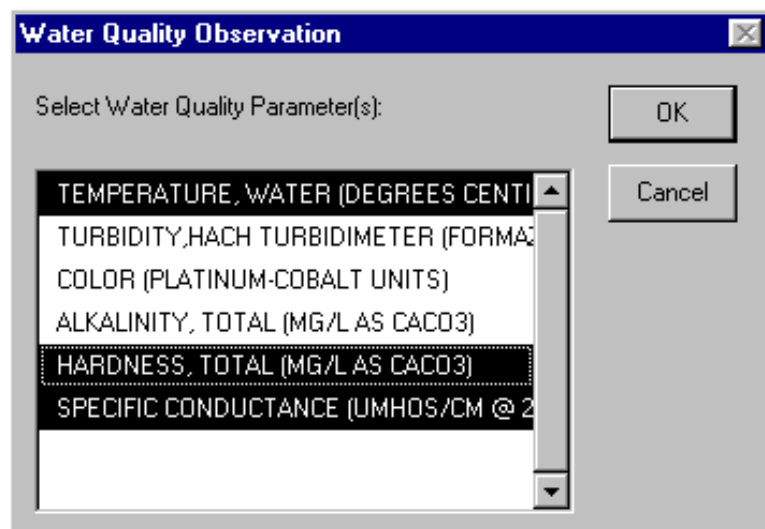
Screen 7.4.12
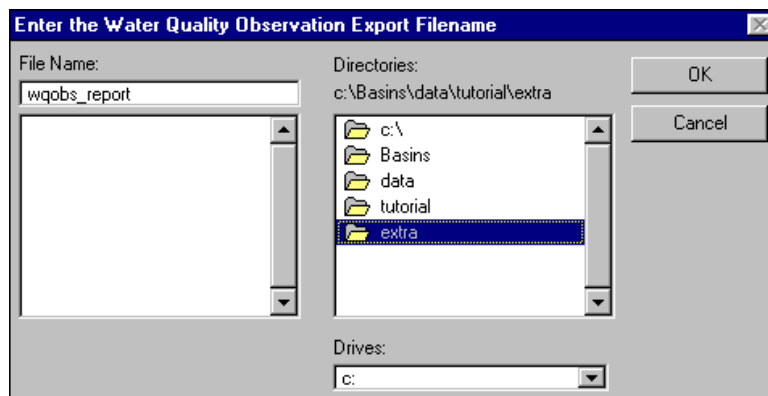
Screen 7.4.13

> *Tip:* *Before saving, remember the directory and file name generated so it can be imported to a postprocessing tool or a commercial spreadsheet for statistical analysis, model calibration, and visualization and graphing.*

Format of the Exported File

The standard format of the exported text file is as follows:

```
[Number of stations]
[Station 1 unique identifier]
[Station 2 unique identifier]
        .
        .
        .
[Number of parameters]
[Parameter 1 code and name]
```

```
[Parameter 2 code and name]
          .
          .
          .
[Station 1 unique identifier]
[Station ID]
[Agency ID]
[Location]
[Cataloging Unit]
[Parameter 1 code and name]
[Number of records]
[Data Header, e.g.  No     Id_samp   Date    Time    Value    Depth]
[Number]    [Sampling Id]     [Date]      [Time]    [Value]     [Depth]
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
[Parameter 2 code and name]
[Number of records]
[Data Header, e.g.  No     Id_samp   Date    Time    Value    Depth]
[Number]    [Sampling Id]     [Date]      [Time]    [Value]     [Depth]
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
[Station 2 unique identifier]
[Station ID]
[Agency ID]
[Location]
[Cataloging Unit]
[Parameter 1 code and name]
[Number of records]
[Data Header, e.g.  No     Id_samp   Date    Time    Value    Depth]
[Number]    [Sampling Id]     [Date]      [Time]    [Value]     [Depth]
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
[Parameter 2 code and name]
[Number of records]
[Data Header, e.g.  No     Id_samp   Date    Time    Value    Depth]
[Number]    [Sampling Id]     [Date]      [Time]    [Value]     [Depth]
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
   .  .          .  .           .  .       .  .       .  .          .
```

Example File:

```
2
06486000+112WRD
06601200+112WRD
2
00010-TEMPERATURE, WATER (DEGREES CENTIGRADE)
00300-OXYGEN, DISSOLVED (MG/L)
BASINS ID:  06486000+112WRD
Station ID:  06486000
Agency:  112WRD
Location:  Missouri River at Sioux City, IA
BASINS CU:  10230001
Parameter:  00010-TEMPERATURE, WATER (DEGREES CENTIGRADE)
Number of Records:   10
NO   Id_samp   Date  Time   Value  Depth
 1  0644000001 800121 1045 0.00001
 2  0644000002 800208 0830 0.00001
 3  0644000003 800310 1530 1.00000
 4  0644000004 800404 1240 4.00000
 5  0644000005 800417 1435 10.00000 4.60000
 6  0644000029 800417 1515 10.00000
 7  0644000030 800529 1110 21.00000 20.40000
 8  0644000055 800617 1100 22.00000
 9  0644000056 800710 1205 27.50000 5.60000
10  0644000081 800710 1304 27.50000
Parameter:  00300-OXYGEN, DISSOLVED (MG/L)
Number of Records:   12
NO   Id_samp   Date  Time   Value  Depth
 1  0644000001 800121 1045 13.60000
 2  0644000002 800208 0830 13.90000
 3  0644000003 800310 1530 12.40000
 4  0644000004 800404 1240 12.20000
 5  0644000055 800617 1100  8.70000
 6  0644000082 800811 1100  7.80000
 7  0644000108 800916 1230  8.10000
 8  0644000109 801007 1240  9.20000
 9  0644000136 801104 1345 11.00000
10  0644000137 801203 1045 13.20000
11  0644000138 810106 1000 13.80000
12  0644000139 810206 1230 13.90000
BASINS ID:  06601200+112WRD
Station ID:  06601200
Agency:  112WRD
Location:  Missouri River at Decatur, NE
BASINS CU:  10230001
Parameter:  00010-TEMPERATURE, WATER (DEGREES CENTIGRADE)
Number of Records:   9
NO   Id_samp   Date  Time   Value  Depth
 1  0644100001 800409 1245  6.00000
 2  0644100002 800507 1100 16.00000
 3  0644100003 800611 1245 24.50000
 4  0644100004 800716 1145 25.50000
 5  0644100005 800813 1245 25.00000
 6  0644100006 800917 1215 21.50000
```

```
 7  0644100007 810219 1400  2.00000
 8  0644100008 810310 1100  5.00000
 9  0644100009 810408 1100 12.00000
Parameter:  00300-OXYGEN, DISSOLVED (MG/L)
Number of Records:   13
NO   Id_samp   Date  Time   Value  Depth
 1  0644100001 800409 1245 11.80000
 2  0644100002 800507 1100  9.30000
 3  0644100003 800611 1245  9.40000
 4  0644100004 800716 1145  7.70000
 5  0644100005 800813 1245  8.30000
 6  0644100006 800917 1215  8.10000
 7  0644100007 810219 1400 12.80000
 8  0644100008 810310 1100 12.90000
 9  0644100009 810408 1100  9.80000
10  0644100010 810506 1130  9.00000
11  0644100012 810708 1045  7.60000
12  0644100013 810805 1130  7.90000
13  0644100014 810909 1100 10.10000
```

TUTORIAL

- *Click the theme Water Quality Observation Station to make it active (Screen 7.4.11).*

- *Check its check box to display the point locations of the observation stations in the View window.*

- *Use the Select Feature tool to select the station in which the export file will be generated. For this tutorial, the station selected is indicated in Screen 7.4.11 in a different shade (e.g., yellow when in color).*

- *Select the submenu Export Water Quality Observation Data under the main menu Utility.*

- *In the dialog box that appears, select the parameters as shown in Screen 7.4.12 and click to continue. In the file dialog box that appears, enter the filename as shown in Screen 7.4.13 and save it in the Extra directory under the \Data\Tutorial directory. Click OK to export the file and end the tool. A word processor can be used to open this export file.*

7.5 DEM Reclassification

Purpose

Digital elevation models (DEM polygon coverages) used in BASINS contain large amounts of spatially distributed information that cannot always be displayed in suitable detail. The ***DEM Reclassification*** tool allows a user to modify default color and interval schemes to display more detailed information based on the elevation features of selected areas, such as watersheds. A more detailed classification of selected areas within watersheds permits a more accurate delineation of subwatershed boundaries.

Application

This tool performs a topographic reclassification of the DEM coverage based on the elevation features of a selected watershed or area of interest within a watershed. A key feature is the ability to assign different numbers of classes to hilltop, middle basin, and valley areas depending on the watershed relief. This type of classification allows the user to focus the classification on key areas in the watershed. Potential applications of the ***DEM Reclassification*** tool include assisting in the watershed delineation process and providing more detailed elevation changes indicative of the severity of the relief.

Procedures

Key Procedures

✓ *Activate the DEM Polygon theme*

✓ *Zoom in and select the area of interest within a watershed*

✓ *From the Utility menu select the Re-classify DEM option*

✓ *In the BASINS DEM Classification dialog box, set your classification parameters*

✓ *Select a color scheme for DEM's legend*

---

1. Activate the DEM polygon theme by clicking on the theme name.

Tip: *If you did not extract a DEM polygon during data extraction, you will need to run extract again and add it to your database directory.*

---

2. Zoom in and select the area of interest in the watershed.

Tip: *You can use the Select Feature tool or use the Select by Theme option under the Theme menu to select an area of interest on the DEM polygon theme. The DEM's reclassification will be based on the elevation features of the selected area.*

Tip: *DEM data are tiled by watershed (8-digit Cataloging Unit) and therefore cannot operate on multiple watersheds.*

Tip: *DEM Reclassification operates on large amounts of data and therefore performs extensive processing. It is desirable to limit analysis to small watersheds. You can use the Watershed Delineation tool to define a subwatershed of interest and then apply DEM Reclassification.*

---

3. From the *Utility* menu, select the *Re-classify DEM* option.

4. Assignment of classification parameters (Screen 7.5.1):

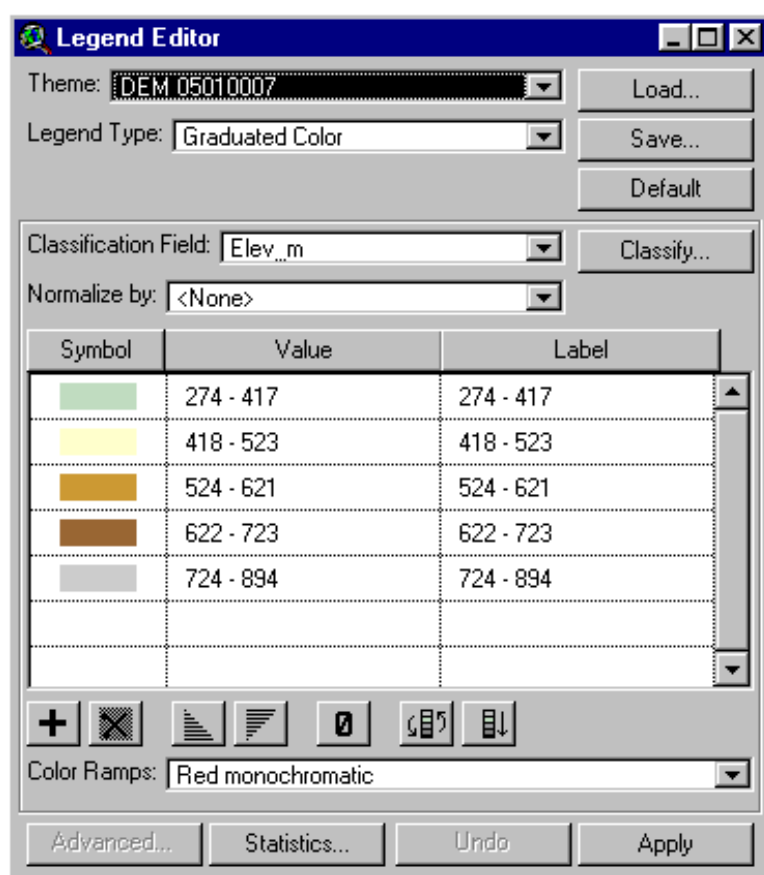|	
Hilltop Zone (%)	Sets the number of higher elevations, in terms of the percent of total elevations, to include in the hilltop zone. Select a small percentage to display a more detailed classification of higher elevations.
Hilltop Classification Interval (m)	Class interval for the hilltop elevations. Enter a small interval if you want to see a more detailed classification in hilltop areas.
Valley Zone (%)	Sets the number of lower elevations, in terms of the percent of total elevations, to include in the valley zone. Select a small percentage to display a more detailed classification of lower elevations.
Valley Classification Interval (m)	Class interval for valley elevations. Enter a small interval if you want to see a more detailed classification in valley areas.

After you set the classification parameters, the maximum, minimum, median, and mean elevation, as well as standard deviation statistics for the selected area, are displayed in the lower left corner of the dialog box. Classification information is summarized in the top right corner of the dialog box. A suitable classification scheme may require a few attempts at classification parameter selection.

5. Select a color scheme for the legend of the DEM polygon theme from the drop-down list in the lower right corner of the dialog box.

6. Click **OK** to finish DEM reclassification.

Tip: To change the color scheme without changing the classification after the DEM reclassification is finished, select the Edit Legend option under the Theme menu or double-click on the legend of the DEM theme to open the Legend Editor (Screen 7.5.2). Choose another color scheme from the Color Ramps drop-down list.

Screen 7.5.1

Screen 7.5.2

TUTORIAL

- *Activate the DEM 05010007 theme.*

- *Zoom in on the watershed.shp theme.*

- *Select an area encompassing the three subwatersheds in the watershed.shp theme.*

- *From the Utility menu, select Re-classify DEM.*

- *Assign a value of 20 to "Hilltop Zone", 10 to "Hilltop Classification Interval", 20 to "Valley Zone", and 10 to "Valley Classification Interval". Select the Red Monochromatic color scheme. Click **OK**. Note that the entire DEM 05010007 theme is reclassified to better represent your selected area.*

7.6 Lookup Tables

Purpose

The ***Lookup Tables*** provide users quick and easy access to important reference information such as the map projection, definitions of agency codes, Standard Industrial Classification (SIC) codes, and the water quality criteria and threshold values of a particular pollutant.

Application

The ***Lookup Tables*** provide four types of information: (1) water quality criteria and threshold values, (2) SIC codes and definitions, (3) STORET agency codes and definitions, and (4) the map projection of the map products in the current BASINS project file.

The lookup table for the water quality criteria provides key threshold values that a user needs when applying ***TARGET*** at a regional scale or when examining water quality summary data at specific monitoring stations.

The lookup table for the map projection of the data products in the current BASINS project file is useful for reference purposes, particularly when new data have to be added. For the new spatial data to be displayed in the same map extent as the existing data, the map projection parameters specified in the lookup table should be used during projection.

The lookup table for the agency codes can be used as a reference to identify the source of monitoring data in BASINS. The lookup table for the SIC codes can be used as a reference to identify the industrial classification of a point source discharger.

Procedures

<div style="border: 2px solid black; padding: 20px;">

Key Procedures

Water Quality Criteria and Threshold Values

    ✔ *Under the Lookup menu, select the Water Quality Criteria menu*

    ✔ *Select the pollutant in the dialog box to view the corresponding threshold values*

Standard Industrial Classification Codes and Definitions

    ✔ *Under the Lookup menu, select the Standard Industrial Codes menu*

    ✔ *Select the search option (SIC Number or SIC Name) in the dialog box and select a specific SIC number (or name) to display the corresponding SIC name (or number)*
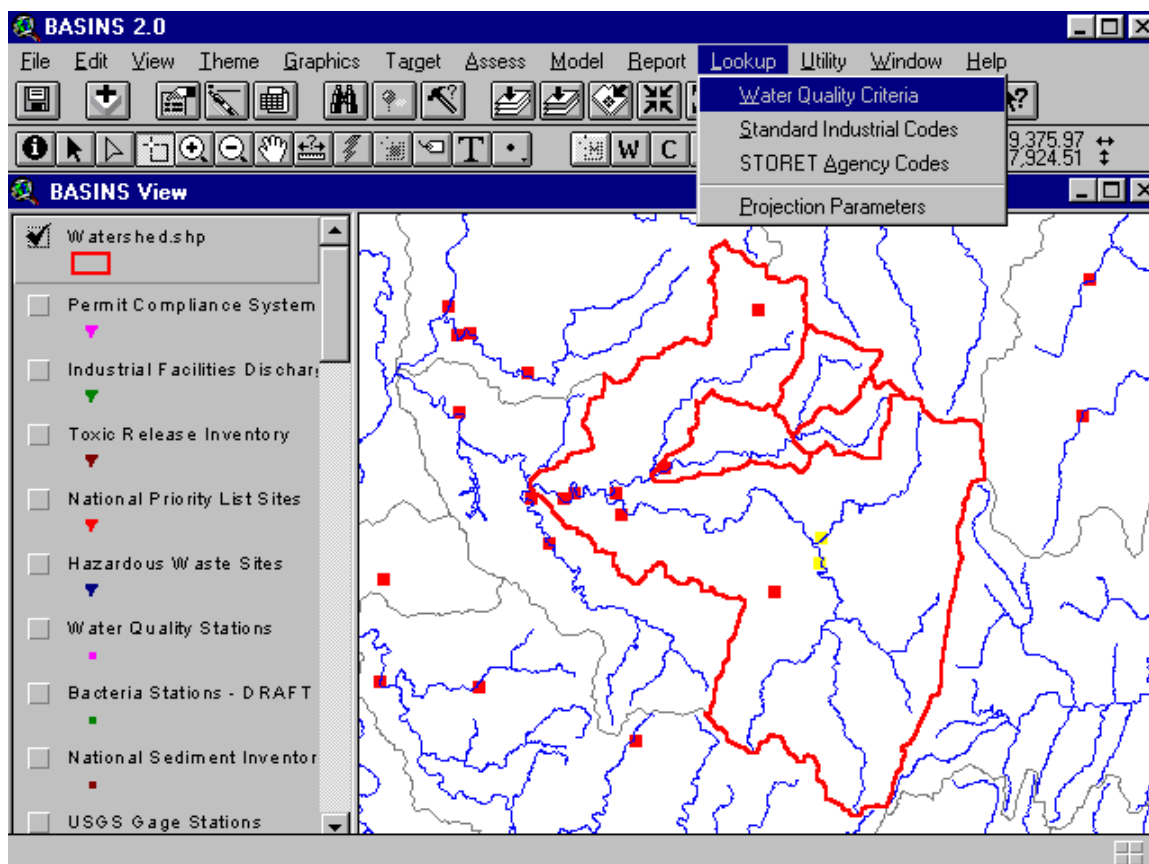
STORET Codes and Definitions

    ✔ *Under the Lookup menu, select the STORET agency codes and definitions menu*

    ✔ *Select the STORET agency code in the dialog box to display the corresponding program name, contact person, and telephone number*

Map Projection Parameters

    ✔ *Under the Lookup menu, select the Projection Parameters menu*

</div>

Water Quality Criteria and Threshold Values

1. With BASINS View active (Screen 7.6.1), select the *Water Quality Criteria* menu under the *Lookup* menu. Note that the lookup tables do not depend on what themes are active in the BASINS View window.

2. In the scroll box of the dialog box that appears (Screen 7.6.2), select the monitoring parameter by clicking on its name. The threshold values associated with the selected pollutant parameter for six water quality criteria are displayed in the text box in the bottom half of the dialog box. Threshold values are displayed for freshwater acute and chronic, marine acute and chronic, and human health carcinogenic risk (recalculated values) for water and organic tissue. The Chemical Abstract Service (CAS) number and the STORET parameter code are also provided for the selected pollutant.

3. Select as many parameters as needed. To quit the dialog box, click the **X** at the upper right corner of the dialog box.
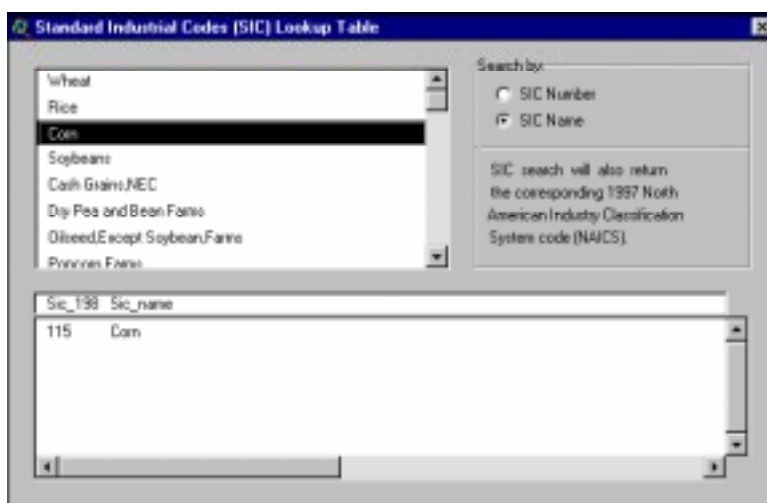
Screen 7.6.1
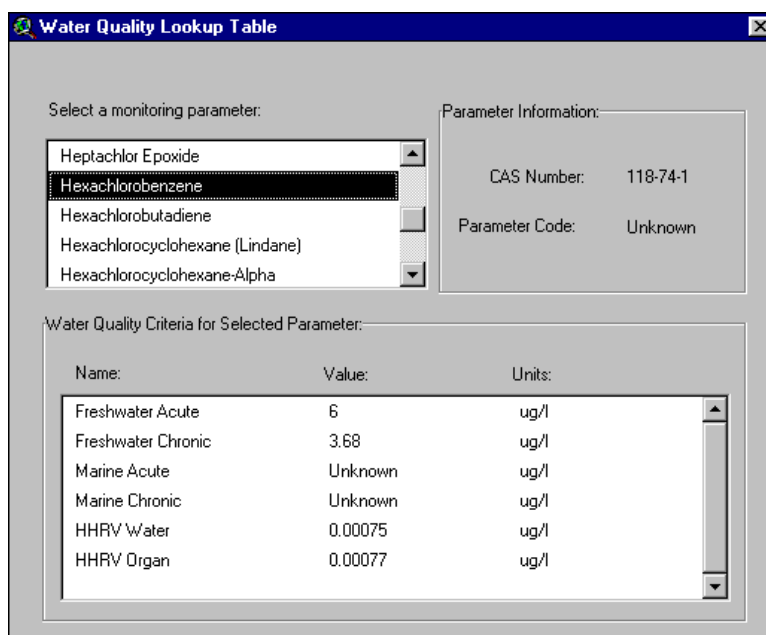
Screen 7.6.2

Standard Industrial Classification Codes and Definitions

1. With BASINS View active (Screen 7.6.1), select the *Standard Industrial Codes* menu under the *Lookup* menu. Note that the **Lookup Tables** do not depend on what themes are active in the BASINS View window.

2. In the dialog box that appears (Screen 7.6.3), click the radio button associated with the preferred search option—by SIC number or by name. Depending on the selected search option, select the SIC number or name in the scroll box by clicking on it to display the corresponding SIC name or number in the text box in the bottom half of the dialog box. The 1997 North American Industry Classification System (NAICS) code and name associated with the selected SIC number or name are also included in the display.
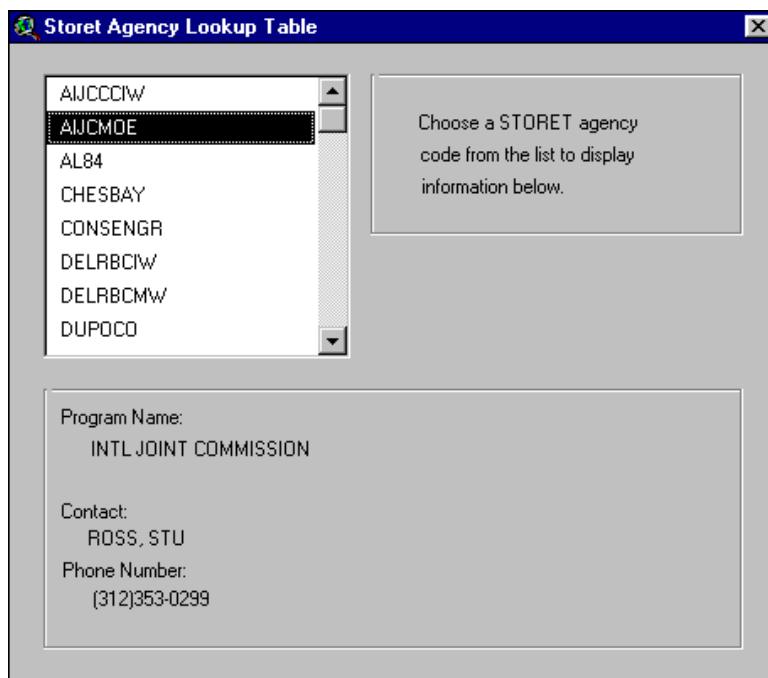

Screen 7.6.3

3. Select as many SIC names or numbers as needed. To quit the dialog box, click the **X** at the upper right corner of the dialog box.

STORET Codes and Definitions

1. With BASINS View active (Screen 7.6.1), select the *STORET Agency Codes* menu under the *Lookup* menu. Note that the **Lookup Tables** do not depend on what themes are active in the BASINS View window.

2. In the scroll box of the dialog box that appears (Screen 7.6.4), select the STORET agency code. The corresponding program name, contact person, and telephone number are displayed in the bottom half of the dialog box.

3. Select as many STORET agency codes as needed. To quit the dialog box, click the **X** at the upper right corner of the dialog box.

Screen 7.6.4

Map Projection Parameters

1. With BASINS View active (Screen 7.6.1), select the *Projection Parameters* menu under the *Lookup* menu. Note that the **Lookup Tables** do not depend on what themes are active in the BASINS View window.

2. The projection parameters of the data products in the BASINS View of the current BASINS project file are shown in the text box that appears (Screen 7.6.5).
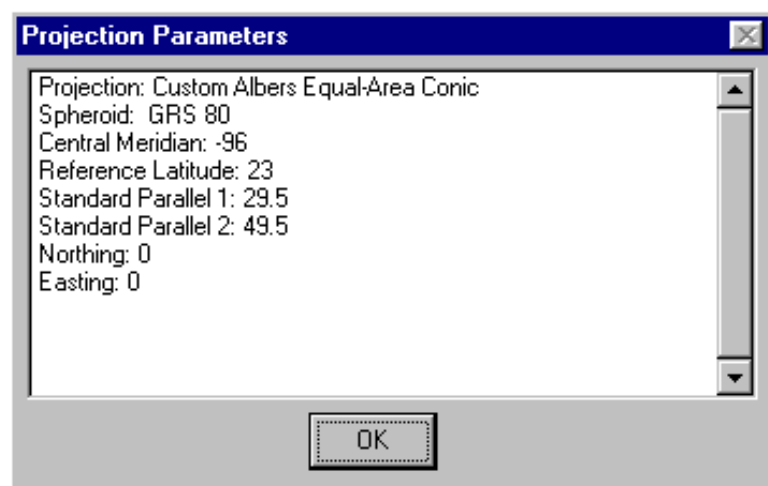
Screen 7.6.5

3. Click **OK** to quit the text box.